Volume XVII.
Number 5

NOVEMBER, 1899.

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TEXTILE WORLD,

and
Industrial
Record.

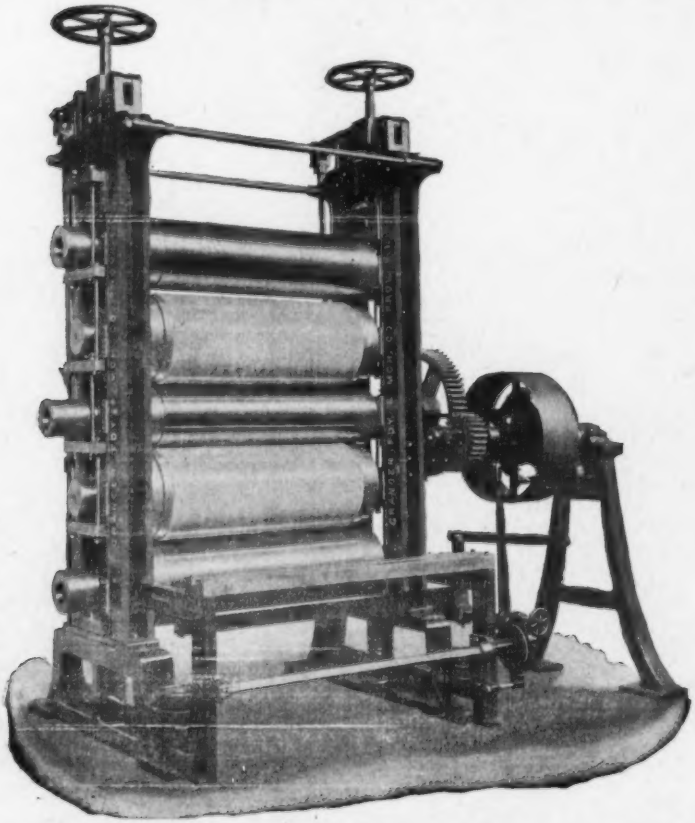
TABLE OF CONTENTS, - - - Page 21
CLASSIFIED INDEX FOR BUYERS - - Page 129

GUILD & LORD.
PUBLISHERS.

620 ATLANTIC AVENUE,
BOSTON, MASS.

Bleaching, Dyeing, Drying,

And Finishing Machinery.



CALENDARS, MANGLES AND ROLLS.

TENTERING MACHINES,
MERCERIZING MACHINES.

Granger Foundry and Machine Co.

PROVIDENCE, R. I.

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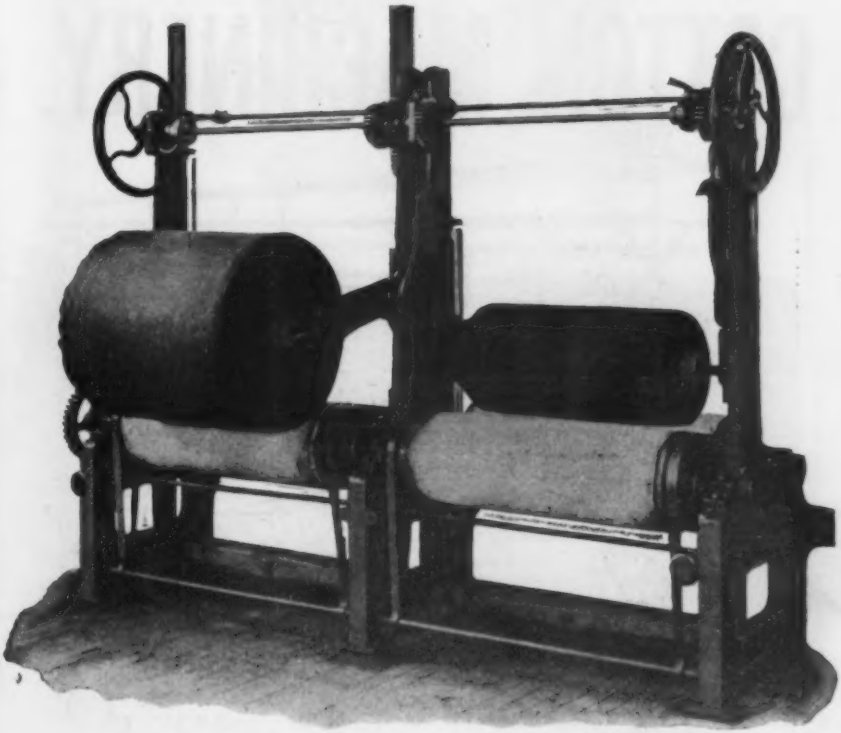
BLEACHING, PRINTING, DYEING AND FINISHING

MACHINERY,

For Textile Fabrics



PATENT WINDING MACHINE.

W. P. SIMPSON, Patentee.

FOR USE IN CONNECTION WITH

Singeing Machines, Soaping Machines, Drying Machines, Etc.

No stoppage or even "Slacking up" of the machine is necessary.

Cutting is done close to the seam, thus eliminating waste.

As creased ends are avoided at beginning and end of roll, no refinishing is necessary.

One man can attend two or more Winders, as the new roll is started automatically, and completed roll can be removed at convenience.

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LOWELL MACHINE SHOP,

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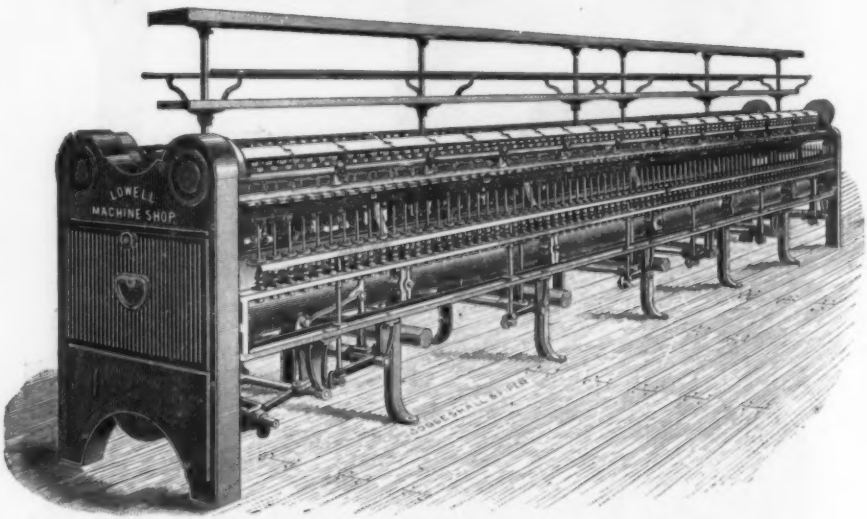
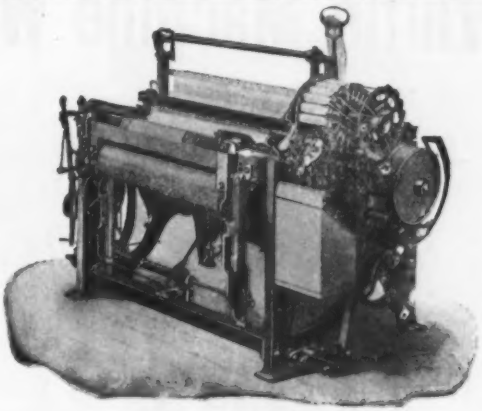
COTTON MACHINERY.



Revolving Flat Cards,
Railway Heads,
Drawing Frames,
Roving Frames,
Ring Spinning Frames,
Twisters, Spoolers,
Warpers, Slashers,
Looms.

WORSTED MACHINERY.



NORTHROP LOOM.

Business is Improving.

MANY cotton mill managers will, therefore, conclude that they can possibly have a chance to run their old machinery at a profit instead of facing a daily loss.

SHOULD they fail to meet the increased demand by improving their facilities with **new machinery**, they will soon realize that the chance of a profit will bring the competition of **new mills** that will start with the latest and best equipment.

THERE is only one profitable plan—**Buy Northrop Looms.** With them the future is assured. They are no experiment. Thousands have been running for years. Sales steadily increase. The mills that refuse their opportunities will find their future utility serving as picturesque ruins in the landscape. We believe we have some honor as prophets **in our OWN country**.

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HOPEDALE, MASS.

The Whitin Machine Works,

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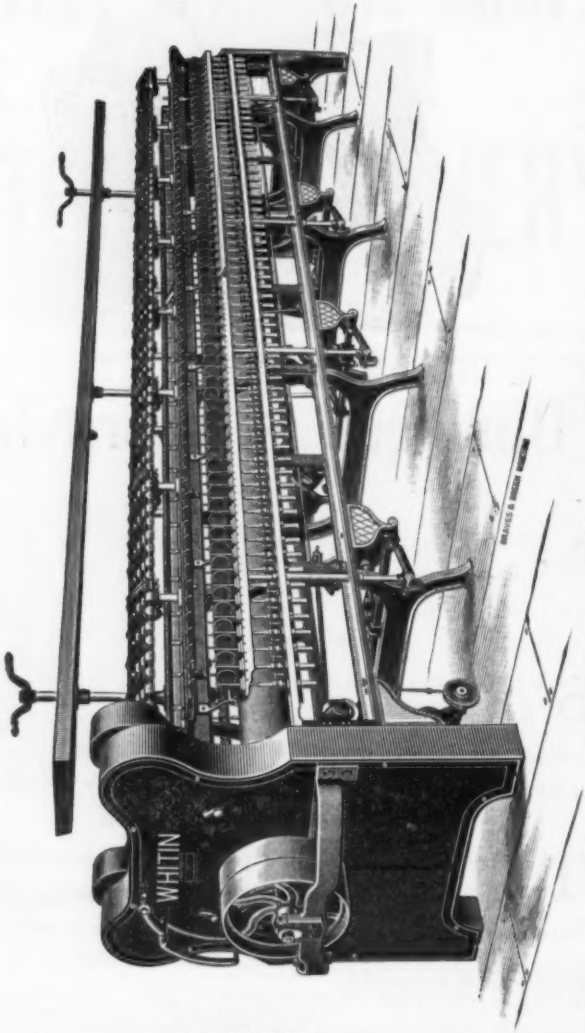
Reels,
Spoolers.

Revolving Flat Carding Engines,
Long Chain Quilling Machines,
Wet and Dry Twisters,
Looms,



The New Whitin Ring Spinning Frame.

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S. W. CRAMER, Southern Agent.

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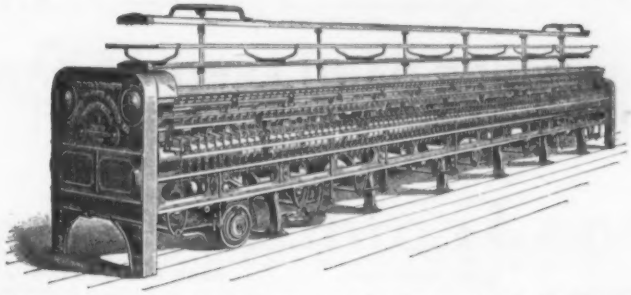
SELF-FEEDING OPENERS
BREAKER LAPPERS
INTERMEDIATE and FINISHER LAPPERS
REVOLVING FLAT CARDS
DRAWING FRAMES With Mechanical or Electric Stop-Motion.
SLUBBING FRAMES
INTERMEDIATE FRAMES
ROVING FRAMES

Improved New Pattern Spinning Frames.



This New Pattern Spinning Frame contains many valuable improvements which will certainly interest you and pay you to investigate. All parts are specially designed and so constructed as to obtain the highest speed and greatest production.

We Invite Investigation and Comparison.

THE FISHER CARD FEED

for WOOL, SHODDY, and COTTON, is

Second to None

on the market. It holds more stock, requires less space, and needs no "attachments."

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Spinners of Worsted Yarns. Mixes and Fast Colors Specialties.
Boston Office, 570 Atlantic Avenue.

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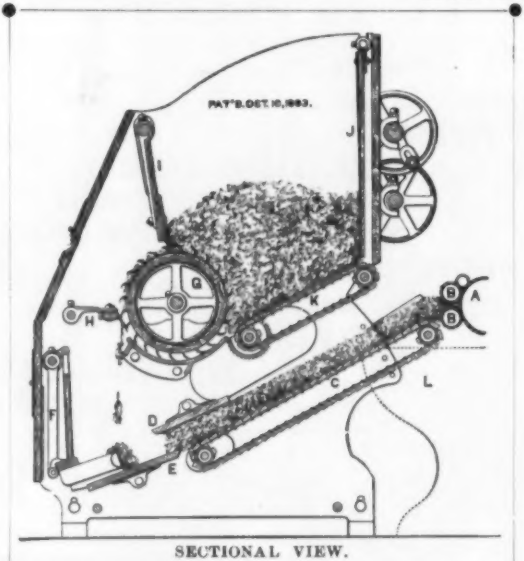
EDWIN FARNELL, Agent.



SECTIONAL VIEW.

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Worsted Yarns.
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Woonsocket Machine and Press Co.,

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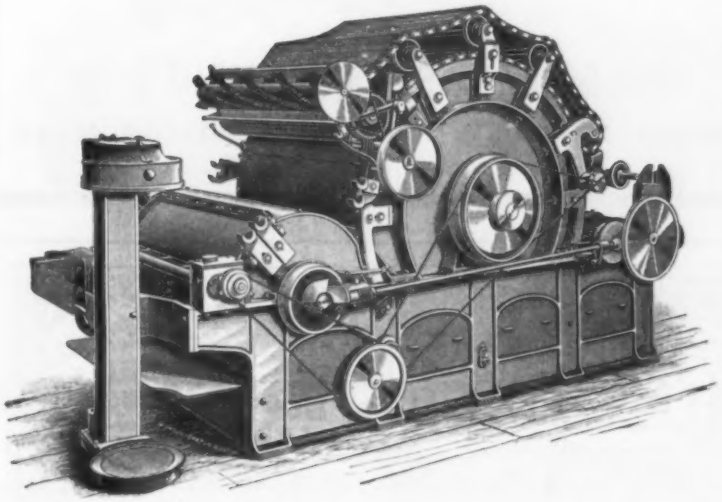

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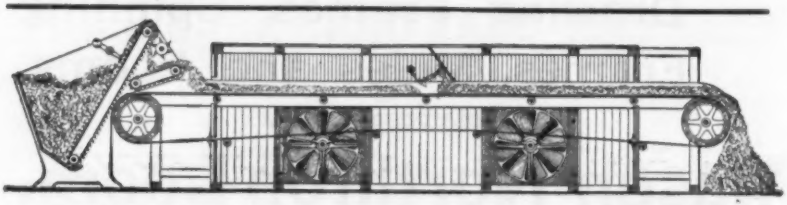

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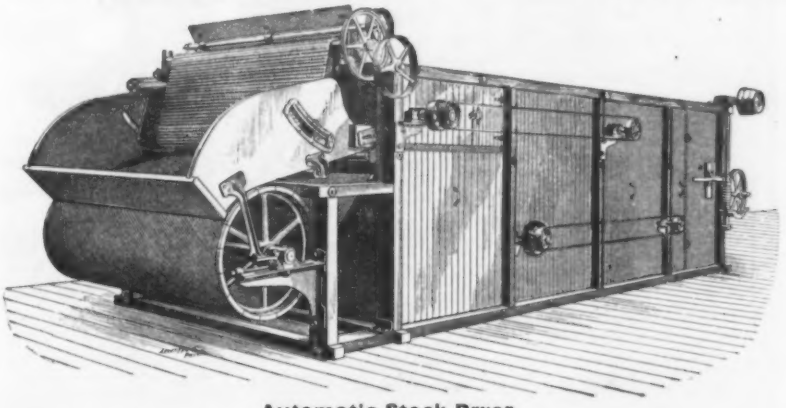

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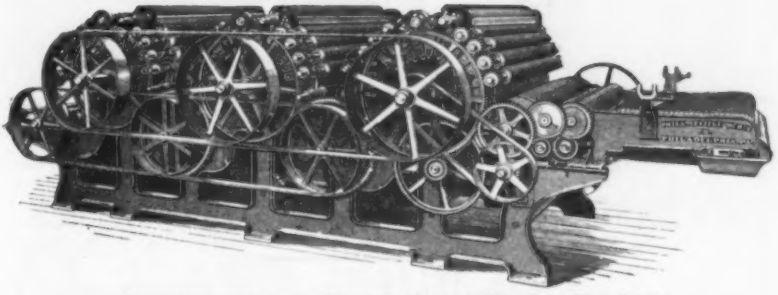

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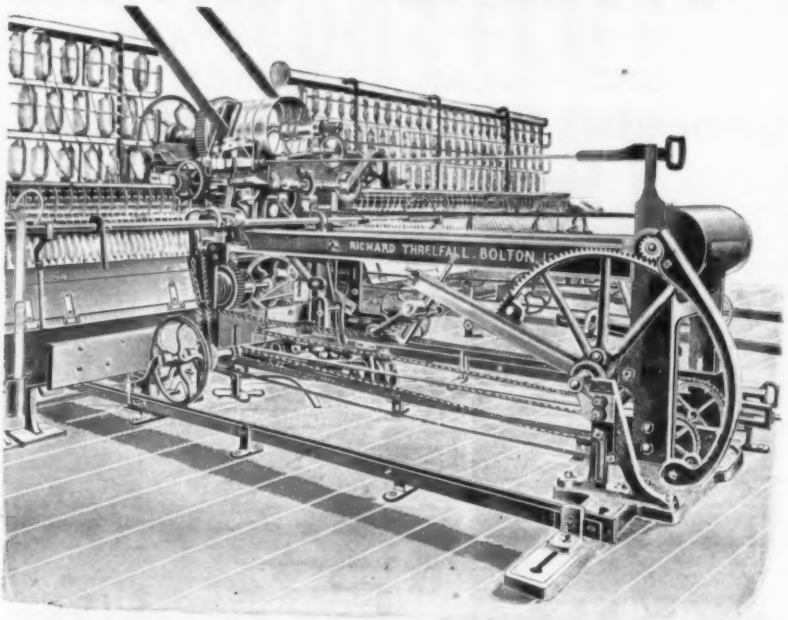

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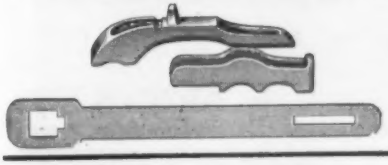

The weight can be taken off and put on to the middle rolls, without stopping your frames, when long staple cotton is used.

The Stirrup is always in place.

No bent stirrup resting on rolls.

Manufacturers of all kinds of **Saddles, Stirrups and Levers.** Send for Samples and Prices.

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I Guarantee An Increase of 6 to 10 Per Cent in the Production of Any Card Room Using My Invention.

I have recently perfected and am now placing on the market under a U. S. Patent, an attachment to a lapping machine, the use of which positively insures a smooth and even lap that will unwind from start to finish without sticking or splitting; thus insuring the continuous running of the carding machine without choking or splitting of the laps, and the consequent loss of time and production, besides improving the quality.

This device is simple in construction, durable, and the cost is so little that no concern that wishes the best possible results for the smallest cost can afford to be without it.

It can easily be attached to a lapping machine of any make without any change in the machine.

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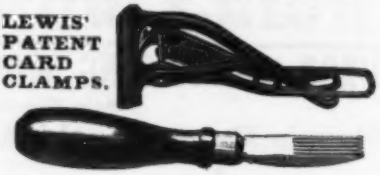

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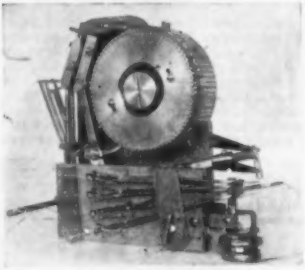

For Description see reading pages this issue.

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HAVE THEM ELECTROTYPED BY

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Where can we get such a machine?

How can we produce that effect, or color, or fabric?

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Proprietors and Publishers.

HENRY G. KITTREDGE, Editor.

PUBLICATION AND HEAD OFFICES:

BOSTON: - 620 ATLANTIC AVE.

PHILADELPHIA OFFICE,
THE BOURSE.

NEW YORK OFFICE,
140 Nassau Street.

Subscription Price.

$2.00 per year for U. S. and Canada.
2.50 per year for Foreign Countries.
3.00 per year with Dyer's Supplement.
(Postage is prepaid by publisher.)

Remit by Express Money Order, Draft, Post Office Order or Registered Letter.

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Special quarterly issues are published in January, April, July and October; one (January) being a statistical issue, and the others devoted especially to the cotton, knitting and woolen branches, respectively.

CONTENTS.

	PAGE
Portrait and Sketch of Chester A. Dresser	27
Business	28
The Wool Supply	29
Important Tariff Decision	32
Numbering Yarn	33
The "Open Door" Policy	36
New Bedford Textile School	38
Paris Exposition	48
Cotton Ginning	50
Khaki	51
National Export Exposition	53
Cotton Department	
Principles of Cotton Spinning—Leno Jacquard Weaving—Questions and Answers—Dederick Bale	56
Woolen Department	
Ingenuity in Modern Textiles—Construction of Woven Textures—Carpet Designing and Manufacture	65
Knitting Department	
Knit Goods Situation—Stocking Knitting Machine—Striper Attachment—Splicing Thread Mechanism—American Knitting Machinery in England	75
Silk Department	
Broad Silk Warping—Silk Calculations	83
Power Department	
Mechanical Draft—Water-Power Electrical Plants in the U. S.	91
Dyeing Department	
Dyeing Recipes 161 to 176—New Dyes—Making Dyes—Trade Position of Indigo	98
Questions and Answers	106
New Publications	108
Industrial News	109
Mill News	113
Personals	123
Special Advertisements	138
Situations Wanted	141
Textile Patents	23

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HOPEDALE, Mass., January 2d, 1893.

Mr. George W. Gregory, of Crosby and Gregory, has taken out for us since January 1875, more than two hundred patents. GEO. DRAPER & SONS.

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List of Textile Patents.

Issued September 26, and October 3 10, 17 and 24, 1899.

Baling Press, Cotton. 633,708. Magnus Swenson, Chicago, Ill., assignor to the American Cotton Company, New York City.

Bleaching, Process of. 635,248. Henry Hadfield, Stockport, Eng., assignor of two-thirds to Joseph Johnson Sumner and Willie Hadfield, Furness Vale, England.

Bobbin Latch. 634,662. Henry C. Fowler, Burlington, N. C., assignor of one-half to Edwin C. Holt, Wilmington, N. C.

Carding Engine. 635,634. George Andrews, Buckfastleigh, and Jonas Haley, Cleckheaton, England.

Carpet. 634,797. John Birney, Philadelphia, Pa.

Cloth-Shearing Machine Cloth Rest. 634,602. Wm. F. Amback and Leonard C. Hollingworth, Providence, R. I.

Cloth-Shearing Machine Rest. 634,603. Wm. F. Amback and Leonard C. Hollingworth, Providence, R. I.

Combing Machine. 633,794. Taylor Burrows, London, Eng., assignor to the Flax Combing Syndicate, Limited, same place.

Combing Vegetable Fibres, Machine for. 633,795. Taylor Burrows, London Eng., assignor to the Flax Combing Syndicate, Ltd., same place

Cotton Accumulator and Conveyer, Lint. 633,996.

Cotton-Beater Cover-Locking Device. 633,930. Joseph T. Ward and John B. Curtis, Chicopee Falls, Mass.

Cotton Chopper. 633,935. Henry D. Wilson and Taylor J. Smith, Bainbridge, Ga.

Cotton Cleaner and Conveyer Seed. 633,995. John W. Graves, Little Rock, Ark.

Cotton Gin. 633,993. John W. Graves, Little Rock, Ark.

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Cotton Press Filling Box. 634,859. Ole A. Thorsen and John E. Shutt, Ganado, Tex.

Fibres, Composition of Matter for use in Extracting. 634,154. William Warburton, Stockport, England.

Fibres, Gill-Box Machine for Preparing. 633,793. Taylor Burrows, London, Eng., assignor to the Flax Combing Syndicate, Ltd., same place.

Flax Breaking and Reducing Machine. 634,675. John T. Smith, Heron Lake, Minn.

Fulling Mill. 634,943. Addison S. Hopkins, Bridgeton, R. I.

Gin Driving Mechanism. 634,800. Colbert W. Frown, Leonard, Tex.

Knitting Machine. 633,595. Wm. H. Kehrer, Des Moines, Ia.

Knitting Machine. 634,843. Henry A. Bettney, Carlton, England.

Knitting Machine Striper Attachment. 634,510. Daniel F. Sullivan, Lowell, Mass., assignor of one-half to James A. Cawley, same place.

Loom. 634,681. Thomas Brindle and Merrill O. Steere, Pawtucket, R. I.

Loom. 633,945. Wm. H. Baker, Central Falls, R. I., and Frederic E. Kip, Montclair, N. J.

Loom. 633,944. Wm. H. Baker, Central Falls, R. I., and Frederic E. Kip, Montclair, N. J.

Loom. 633,976. Malcolm G. Chace, Central Falls, R. I., assigner of 17/20 to Wm. H. Baker and Frederic E. Kip.

Loom Dobby. 634,632. George W. Stafford, Providence, R. I., assignor to the Crompton & Knowles Loom Works, same place.

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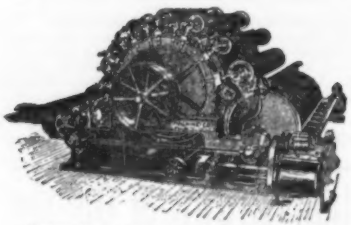

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Loom Filling Carrier. 635,716. Charles M. Day, Hopedale, Mass., assignor to the Draper Company, same place and Portland, Me.

Loom Shuttle Changing Mechanism. 635,952. Emil Claviez, Leipsic, Germany.

Loom-Shuttle, Self Threading. 634,830. James H. Northrop, Hopedale, Mass., assignor to George Draper & Sons, same place.

Loom Thread-Parter. 634,852. Earl P. Mason, Newport, R. I., assignor to the Draper Company, Portland, Me., and Hopedale, Mass.

Mercerizing Apparatus. 634,362. Percy S. Marshall, Huddersfield, England, assignor to Copley, Marshall & Company, Ltd., same place.

Napping Machines, Apparatus for use in Connection with. 633,664. Louis Schneider, Mittweida, Germany.

Ramie Defibrating Machine. 635,345. Willard N. Packer, Cleveland, Ohio, assignor to Phillips Abbott, trustee, New York City.

Spindle. 635,960. Thomas W. Cocker, Paterson, N. J.

Spindle-Guard for Textile-Treating Machines. 633,956. Benjamin N. Goodale, Saco, Me.

Spinning Frames, Etc., Roping Guide for. 635,686. Noah G. Huffstickler, Mount Holly, N. C., assignor of three-fourths to Edmund M. Asbury and Robert H. Stowe, same place.

Spinning Machine. 633,964. William McMichael, Woonsocket, R. I.

Spool or Bobbin, Yarn. 634,738. Thomas Sampson, Waterville, Me.

Textile Clamp. 633,630. Charles L. Weichelt, Philadelphia, Pa.

Weaving Apparatus, Fabric. 635,198. Edward Smith, Bradford, England.

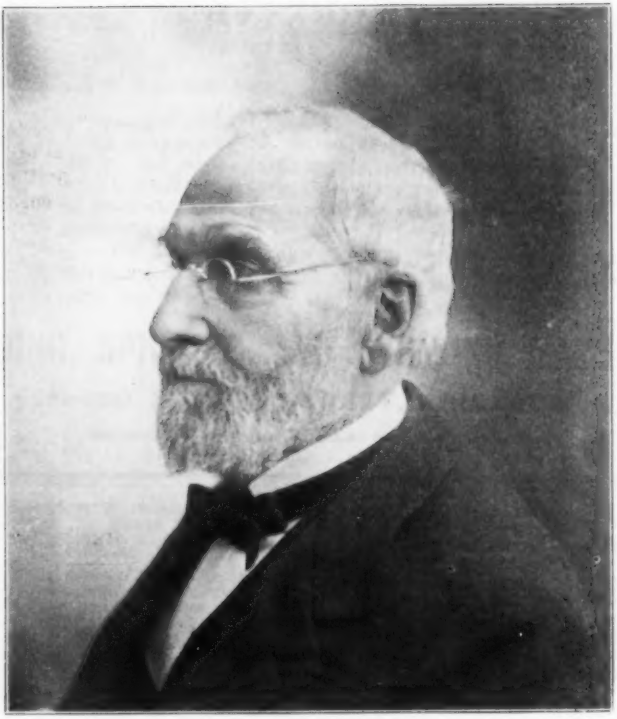
Weaving Pile Fabrics, Apparatus for. 634,037. Richard N. W. Smith, Paisley, Scotland.

Wool, Apparatus for Purifying Washwaters from. 633,688. Jules Delattre, Dorignies, France.

Wool Slivers, Process of Cleaning. 633,703. Emile Roussel and Desire Lefebvre, Roubaix, France.

—The Globe Mill, at Globe Village, Southbridge, Mass., was originally built in 1814, and operated by the Wolcott Woolen Company, incorporated, and claimed to be the first mill to make printed dress goods or delaines.

—From the advent of Mr. Ballard the Hamilton Company has ranked as one of the most successful wool-manufacturing corporations in the country, and its genealogy entitles it to be ranked as the oldest of these corporations now existing.



CHESTER A. DRESSER.

TEXTILE WORLD.

Vol. XVII. NOVEMBER, 1899. No. 5.

CHESTER A. DRESSER.

With the recent death of Chester A. Dresser, the textile manufacturing community, and of Southbridge, Mass. in particular, suffered a most palpable loss. Judged by what he did for his native town, Mr. Dresser stands out clearly and distinctly beyond any other. He furnished employment for thousands of people, contributed freely to beautify the town in which he lived, and though the heaviest of its tax payers, he was in favor of every measure or enterprise that tended toward its material progress.

Mr. Dresser was essentially a self made man, being thrown by events into the cotton manufacturing business, which he thoroughly mastered.

Mr. Dresser was born in Southbridge, Mass., Sept. 2, 1818, son of Chester and Deborah (Ammidown) Dresser. At the age of 13 he went to work in the general merchandise store of Milton Joslin, then kept in what is now Comstock's block on Main Street.

A few years later he went to work in the mills of the Columbian Manufacturing Co., a corporation at the time composed of E. D. Ammidown Moses Plimpton, Dr. Samuel Hartwell Wm. Healey and others.

In 1840, when 22 years old, he was hired to superintend a cotton mill in Petersburg, Va., at a salary of $1000 a year. After two years at Petersburg, he was again back in Southbridge and was soon operating a cotton mill in Westville, a cotton factory furnishing the stock and he running the mill on shares.

His next business venture was his acceptance of the management of the Dresser Manufacturing Co. mills that were burned in 1872. Mr. Dresser became superintendent of the mills of the Central Manufacturing Co., founded in 1837, with a capital of $125,000.

In 1857 the Amoskeag Manufacturing Co., Manchester, engaged Mr. Dresser to take charge of its numerous mills and he remained in Manchester two years, meeting with entire success.

In 1858 he associated himself with Manning Leonard in the purchase of the Central mills for $40,000. As a cotton manufacturer Mr. Dresser has always been progressive.

Every new invention that gave promise of a step in advance in cotton manufacture he had been quick to adopt, and as a result, the mills and himself were thoroughly up to date and the times were never so depressed as to stop the wheels of the mill, or to cause a curtailment of production. In this respect the plant is almost without parallel in the history of New England cotton manufacture.

In 1861 Mr. Dresser built a beautiful house on Main Street, where he lived up to the time of his death. In 1871 he built the C. A. Dresser House at a cost of over $80,000, and provided for Southbridge one of the best hotels in Worcester county. Mr. Dresser leaves one son, Frank, and a daughter, Mrs. Stephen K. Edwards.

Mr. Dresser was a Mason, and was first master of Quinebaug lodge after its re-formation. He held the office several years, taking a deep interest in Masonic affairs. Besides being identified with nearly all the quasi-public corporations of this town, he was for more than 20 years a member of the Providence Board of Trade.

BUSINESS.

It is a matter of much satisfaction to be able to write concerning the conditions of business, as they are full of evidences of substantial prosperity, with every sign of permanency for some time to come. Probably the country was never in a more generally prosperous condition than it is today, affecting all industries, in giving employment to all those who are willing to work. The simple fact that all are employed in earning a subsistence, at least, is enough to place all business affairs upon a satisfactory basis.

It was not until well into 1898 that any real prosperity existed among the industries of this country, since the crisis of 1893, which disturbed public confidence and seriously threw out of gear the financial machinery, the latter, however, due mostly to the political agitation concerning the coinage of silver. While the five years succeeding 1893 may be considered a period of depression almost unknown in the history of this country, the activity that we see and feel today never was so great. A period of expenditure has thus followed a succession of years of economy and liquidation. There are various causes leading up to the present state of affairs, a potent one being the large wheat crops of 1897 and 1898, which were sold at good prices, enabling farmers to pay off their indebtedness and create a surplus fund, thus having an effect upon our industries similar to the great grain crops that brought about the revival of trade in 1879 and 1880.

New elements, however, have crept into our industrial system, which are largely experimental, namely, the trust organization, with which we are becoming more and more familiar, but the result of which remains problematical. We have already commented upon this system of combining individual concerns of the same industry, and have regarded it as containing many dangerous elements that will show themselves when the tide turns and production exceed consumption. Since our last issue appeared, important movements have taken place among the knit underwear manufacturers in New York State, resulting in the organization of the American Knit Underwear Association, officered by some of the most successful and best known manufacturers of knitted wear in this country.

In cotton goods, prices have materially advanced since the beginning of the year—fully fifteen per cent. on the average. Woolen goods have also advanced in price, from ten to thirty per cent. Within the last month large sales of wool have been consummated at a considerable increase in price, which has had a strengthening effect on the manufactured article. We speak upon the wool supply in another article.

There is much speculation as to the future of the cotton crop and the price of the staple. The market is now mostly influenced by conditions that exist in the manufacturing sections of Europe, and by the war-like disturbances that are taking place in South Africa, though the latter have no more than an indirect bearing, by taking up the attention of business men from the affairs of peace to those of war. Liverpool is affected more by these latter conditions than any other locality. There is a considerable diversity of opinion as to the probable size of this season's crop; exporters generally believing that it is under estimated, while the merchants of the South evidently entertain a different view, as they are tenaciously holding what they have in hand for better prices. There is no doubt that the consumption of cotton this year will be the largest ever known in the history of the world. All of the spindles in this country and abroad are running at their utmost speed, and it is thought that the mills of the United States alone will require four million bales. Should there not be a crop exceeding ten and a quarter million bales the prospects show a decrease in the visible and invisible supply at

the end of the year of at least 400,000 bales less than last year. At present writing, the amount of cotton in sight is about 2,800,000 bales, which indicates a crop of 10,200,000 bales, presuming that the same proportion of the crop has been marketed as was the case last season, thus far. The total takings of American mills are already 28 per cent. more than last year, for the same period, since September 1. A. B. Shepperson, the well known cotton statistician, writes us that his advices point to a very moderate crop of cotton, probably 800,000 to 1,000,000 bales less than the spinners of the world can take. This seems to justify the advance in the price of cotton.

THE WOOL SUPPLY.

The National Association of Wool Manufacturers has just issued an exceedingly valuable report on the United States wool clip of 1899, showing a total wool product for this year of 272,191,320 pounds, of which 33,754,761 pounds is pulled wool. This product of washed, unwashed and pulled wool gives an estimated scoured product of 113,958,468 pounds.

These annual reports of this association have long been regarded as the most reliable and scientifically prepared of any on this subject. The methods employed are the best that have been devised, and have been so recognized by experts and others.

The estimates of the wool product have been based on the annual reports of the United States Department of Agriculture of the number of sheep on hand April 1. This year's report gives the number of sheep in the country at 36,906,497, supplying an estimated average weight of fleece of 6.46 pounds, with an average percentage of shrinkage of 60.7, for the sheared fleece, and 40 for pulled wool. There has been an increase in the wool product of the country, since 1897, of about 13,000,000 pounds. The tariff has contributed, apparently, but little towards increasing the wool product of the country, notwithstanding the increased value of sheep and the advance in the price of the fleece. The sales of wool in Boston (the principal wool market in this country), for the current year, will probably show a larger amount than any previous year in the history of the trade, except 1897, when large quantities of wool were disposed of, or changed ownership, on account of conditions more or less affected by the passage of the tariff act of that year.

In many respects the chief interest in the association's report lies in the accompanying correspondence from those capable of forming a correct opinion concerning the changes that have taken place of late years in the character of sheep husbandry in the United States; that of going from the merino to the English and coarse bred sheep, and the more recent tendency to a reversion back to the fine wool products of the merino. The merino stud flocks of Vermont, of late years, have been passing out of existence, as noted by a correspondent residing in Addison County, of that state. This has such an important bearing upon the merino sheep husbandry of this country and of the world, that we think the following views from an excellent authority are worthy of notice.

"The fleeces in this county (Addison) are lighter, and have been growing lighter very rapidly, and of lighter shrinkage, because our breeders have been reducing their merino flocks, or crossing them with the mutton breeds until there is a very limited number of thorough bred merino sheep left here, and a largely increased number of the coarse or medium-wooled light shearing sheep. A few years ago the clip of this county was almost exclusively heavy fine merino wool, many clips averaging from 12 to 18 pounds to the fleece. Today there is not over one merino fleece clipped to half a dozen medium fleeces. Hence the character of our clip is entirely changed from heavy fine merino to light medium or coarse wool, the shrinkage of which is, at least, 15 or

20 per cent. less than the merino. The demand for pure bred merino sheep is greater this fall then it has been for years, and many of the coarse wooled flocks will be bred to merino rams."

This is one of the best testimonies showing the tendency away from fine wool sheep and the gradual return thereto, as noted in the latter part of the above communication, which must be looked upon with a degree of satisfaction, owing to the increasing shortage of fine wool.

As it stands today, the Vermont type of merino sheep is to be found more fully represented in the stud flocks of Australia than in its native state, Vermont. Still, the raising of mutton sheep has secured such a firm hold in the sheep husbandry of this country that it probably will not be materially affected for many years, if ever; and if there should be a disposition to reintroduce the merino blood, the most attractive sheep for this purpose is the Rambouillet merino, which is the best sheep possessing the combined qualities of producing wool and mutton. The advance in the price of wool will makes this breed of sheep more popular, while it will be highly valued for its mutton producing characteristics.

Mutton production is affecting the sheep husbandry of all states, and especially those lying east of the Mississippi. The merino is occupying a secondary place in such states as New York, Ohio and Pennsylvania, that have heretofore been largely merino. We note in a letter from a well informed correspondent in Western Pennsylvania, that "flock masters are going back to the merino, especially the delaine merino," but to what extent we are not informed.

The wool clips of Wyoming and Montana have shown this season a decided change from the merino to the medium and crossbred wools; still, it is observed by a well known dealer of wool in Boston, that "while of late there has been quite a tendency toward the coarser grade of sheep, still we think that in the Trans-Mississippi states a good many of the growers are now leaning toward the merino delaines."

What is indicated in the report of the Wool Manufacturers' Association, is prevailing elsewhere in the world, as noted in the offerings of wool that have been made at the various series of London auction sales, showing the inroads that have been made by crossbred wools, to the exclusion of merino. This is observed in the annual report of Buxton, Ronald & Company, London, which has just come to hand, in which it is stated that the great preponderance in character and selection of wool that has been offered has been coarse grades, though there are already signs from Australia of a desire to breed back to a finer strain. For the last five years, however, the selection of wools at these sales have shown a serious dwindling in the quantity of merino wools, due to drouths and extensive crossing with coarse breeds. "It is possible," it is remarked, "that in some quarters the transformation in the position of merinos, has been viewed with distrust, as a mere passing event, liable from its very suddenness to early reaction: but the data in support of an exactly opposite conclusion would seem to be as ample as they are convincing. So long as a profitable outlet can be secured for the mutton from New Zealand and Argentina, sheep farmers in those countries will not have any controling reason for changing the character of their flocks. In Australia the circumstances are different. Experience has proved it to be the adopted home of fine wooled sheep; and not only that, but in no other quarter of the globe can really small-haired wool be grown, either to the same advantage or on the same wholesale scale. Persistent drought has decimated the flocks in New South Wales and several years must necessarily elapse, even after a return of good seasons has set in, before lost ground can be made up."

All evidences, no matter from what quarter they are received, indicate a

great scarcity in the amount of merino or fine wool for manufacturing purposes. The demand and high price for mutton will continue to make the mutton breeds popular, while the high price of fine wools will turn the attention of sheep men more to merino breeds, such as have heretofore characterized the clips of New South Wales and Victoria.

In commenting upon the prices of merino wools in their ascending scale, Buxton, Ronald & Company believe that there is no solid ground for apprehension that so important an advance as that recently witnessed has exhausted the energies of the situation, but that there are several reasons for adopting a contrary conclusion, and these reasons are enumerated as follows: (a) the usual clearance of second-hand stocks; (b) the largely increased outlets for the manufactured article; (c) the knowledge that in various important districts in Australia the drought is as fatal as ever; (d) the certainty that the supply of merinos must not only be again short during the coming year, but that several favorable seasons in succession will be requisite in Australia before the conditions of supply can be materially increased; (e) the strong probability that during the course of next year, the United States will require to replenish stocks of merino wool from foreign sources. Upon these it is believed that no surprise should be occasioned if the prices of fine wool should advance still further during the course of the coming year.

—There is a scarcity of raw silk, and an examination of the statistics of production and consumption of the world leads to the inference that there will be a greater scarcity, approaching a famine, of raw silk before the coming spring is over. The supply for the rest of this season, ending with June, 1900, is estimated will be less than 24,000 bales, from which eight months' requirements will have to be drawn. The Chinese crop of silk shows a shortage of 10,000 bales, which has caused an advance in some instances of 50 cents a pound, which, it is thought, will increase as time goes on.

—The shipments of textile machinery from Great Britain to the United States, thus far this year, have been considerably in excess over the same period in 1897. The United States is a very important customer for English textile machinery. The requirements of the textile mills of Russia, for English machinery, are yearly increasing, being 150 per cent. more for 1899 than they were for 1897, and over 100 per cent. in 1898 than in 1897. It appears that the cotton industry of Japan has come to at least a temporary standstill. Its increase of late years has been in excess of domestic requirements, and, in consequence, the imports of textile machinery from England have fallen off since 1897 nearly 90 per cent., while the demands of China have increased fully 30 per cent.

—The attempt that has now been put into practical operation, of running a cotton mill entirely of negro help, at Concord, N. C., will be watched with much interest, as demonstrating the present capacity of this class of employees for the economical operation of textile mills. It will serve as an object lesson that many have been looking forward to. Even in case of its failure, it cannot be considered a satisfactory demonstration that negro help are not suitable for mill work, more than it will show that they will need further mental development and training for this line of employment. The negroes of the South are still in a state of much ignorance, and before they can become truly efficient, as compared with white labor, they may have to become subject to further educational influences.

—We note in one of our exchanges from South Carolina that within a very few years the cotton mills of that state will consume every bale of cotton produced in it. This is what we predicted in these columns two years ago, and which was looked upon by

some of our Southern contemporaries as wholly improbable. What is now an approximate fact was subject to a clear demonstration two years ago, at least.

AN IMPORTANT TARIFF DECISION.

Some very important decisions have been made of late by the Board of General Appraisers, concerning the classification of imported merchandise, consisting in part of wool, not of chief value. The decisions have a direct and most significant bearing upon the meaning and application of that proviso in the silk schedule, attached to paragraph 391, which reads, "that all manufactures of which wool is a component material shall be classified and assessed for duty as manufactures of wool." The question is, does this proviso, that appears in the silk schedule, affect other schedules in a way as to throw merchandise consisting in part of wool into the wool schedule? The Board of General Appraisers, of late, have decided, in which they are apparently supported by the courts, that this proviso cannot be taken in its application outside of the silk schedule, and, therefore, relates only to such merchandise as consists of silk and wool.

This construction of the tariff law has become more prominent by a decision rendered by the Board of General Appraisers last September, in regard to the classification of cotton quilts with a fringe of wool. The local appraiser at the port of entry returned the goods as manufactures of wool and cotton, cotton chief value, but the duty was assessed under the provisions of the woolen schedule, as "on a manufacture in part of wool." The importers protested against this assessment, and the matter was carried before the Board of General Appraisers, who decided that the importers' contention was well made, and as cotton was the component of chief value, the goods properly belonged within the provisions of the cotton schedule.

From this decision the Treasury Department has taken exceptions and has appealed to the courts, taking the ground that the views of the Board of General Appraisers are wrong, and that the goods were properly assessed in the first instance, resting its reasons on the fact that they were composed in part of wool, as provided for in paragraph 366, and also on the provision in paragraph 391 of the silk schedule, which states "that all manufactures of which wool is a component material, shall be classified and assessed for duty as manufactures of wool."

The Treasury Department contends that the above proviso has a direct application to the woolen schedule affecting all merchandise to which any part of the tariff can be applied, that consists in the least degree of wool. This view, it is claimed, is sustained by the action of Congress during the framing of the present tariff law. When the tariff bill of 1897 was reported by the House, this provision read that "All such manufactures of wool, etc.;" but the Senate eliminated the word "such," and this elimination was accepted by the committee of conference, and in this shape it passed into law. The Treasury Department reasons that this elimination showed the intention of Congress, that this provision was not intended to have an exclusive relation to the silk schedule, but to all schedules affecting merchandise containing the least proportion of wool. Upon this ground an application for a review of the decision of the Board of General Appraisers has been made to the courts.

The position of the Board of General Appraisers is well stated, in two of its very recent decisions rendered last month, relating to the importations of hats of wool and fur, and of tennis balls, the latter composed of

india rubber and wool, india rubber being the component material of chief value.

The decisions in these two cases were made by Judge Somerville, whose opinions are always rendered with the most profound judicial conception of the legal interpretation of the law, and who has, in nearly all instances, where his decisions have come before the courts, been sustained by the latter. Therefore, we regard his opinion as noteworthy, when he says that "the proviso to paragraph 391 of the silk schedule does not affect the question under consideration, as it can operate at most only upon the provisions of the silk schedule."

The presence of the words "not especially provided for," in the various paragraphs of the tariff, are more or less confusing in reaching an understanding of their specific meaning, and oftentimes they come into direct conflict one with another, with the result of neutralizing their effect. It is necessary to take this possibility into consideration when their import becomes an essential feature in arriving at a decision.

It may be interesting to refer to the decision rendered by the Board of General Appraisers September, 1897, on an importation, under the act of 1894, of tennis balls made of rubber and wool, practically the same as the merchandise that was recently imported, upon which a decision has been made, as alluded to above. The Board, in passing upon the first importation, decided contrary to its later decision, classifying the merchandise under the woolen schedule, as a manufacture "composed in part of wool." This decision was reviewed by the United States courts, which reversed the opinion of the Board, and the recent decisions of the latter have been made in conformity with these rulings of the court. If the courts still hold to their rulings, it appears to us that the Treasury Department may lose its case when it comes up for reviewing of the Board's opinion, though contrary, in our opinion, to the intention of the law makers. This legal aspect, also, is jeopardized when it is borne in mind that the law of 1894 did not contain a paragraph similar to paragraph 391 in the act of 1897.

The general principles governing the operation of provisos are stated in Sutherland on Statutory Constructions, as follows: "The natural and appropriate office of the proviso being to restrain or qualify some preceding matter, it should be confined to what precedes it, unless it clearly appears to have been intended to apply to some other matter. It has to be construed in connection with the section of which it forms a part, and it is substantially an exception. . . . It should be construed with reference to the immediately preceding parts of the clause to which it is attached." In commenting upon this statement, Judge Somerville, in his opinion affecting the classification of tennis balls composed of india rubber and wool, as already noted, says that "any other construction would relegate to the wool schedule every article described in the tariff act, which might be shown to contain an appreciable quantity of wool, however small, including such articles as musical instruments and parts therefor, umbrellas, tots, fans, furniture, etc.," for which there are more or less special provisions in the tariff law.

UNIFORM METHOD OF NUMBERING YARN.

In our last month's issue we had a lengthy article, obtained through French sources, of a proposed congress during the Paris Exposition of 1900, to discuss the question of a uniform system of numbering yarn in the manufacturing countries of the world.

The subject is looked upon as one of much importance to the textile industry, though how to bring it about is a serious problem, in a manner which will not have a disturbing influence upon trade conditions. A circu-

lar letter has been addressed, by the committee that is organizing the congress, to French manufacturers, for the purpose of getting them to arrive at some satisfactory method themselves, before it is formally presented to the manufacturers of other countries. The idea is to introduce the killogrammetric system of numbering, which gives the number of kilometres of thread contained in a kilogram, for all textile material other than silk; that is, the kilogram is taken as the unit of weight, and the kilometre as the unit of length. As is well known, there are two methods of numbering, one in which the numbers increase with the fineness of the thread, and one in which the number increases or decreases in proportion with a standard of length according as the scale of weight is ascending or descending. It is thought that a uniform system could be effected if the manufacturers of the United States and Great Britain would take the matter in hand with a determination to arrive at uniformity. If this could be brought about by these two countries, it is thought that the European manufacturers would arrange all differences in their systems, and bring them to a uniform standard, with the understanding, however, that the latter shall be based upon the metric system.

There have been four international congresses since 1873, the latter one taking place in Paris, in 1878, but nothing was accomplished, and the same fate may attend any efforts that may be made next year, though the exposition of 1900 seems to offer opportunities that are favorable for the consummation of the object. It is generally regarded that silk will have to have a system of its own, different from that applicable to other textiles, on account of the fineness of its thread, which makes it impossible to use the kilogram as the unit of weight, and that the numbering must be indicated by the weight in grams of a myriametre of thread. Other textiles can conform to the above method of numbering, calling No. 100, for example, as representing 100 kilometres of thread for every 1000 grams in weight.

When this subject was discussed in 1875, at Turin, the question of condition was discussed, which has been considered ever since as an important factor to be considered, as the hygrometric properties of fibres often occasion differences which must be recognized. When this matter was considered at Paris in 1878, this "conditioning" was decided should be obligatory only upon demand of either the seller or the buyer.

As examples of the confusion in the numbering of yarns according to the various systems that are in use, it may be noted that No. 10's worsted contains 5600 yards to the pound; cotton, 8400 yards; raw silk (Denier scale) 6933 yards; linen, 3000 yards; woolen, from 160 to 3200 yards (in different parts of England); 16,000 yards woolen (American). It will be noted here the great diversity in the number of yards that are in one pound for the same fineness of yarn under different systems. To state the diversity in another form, taking No. 1 as the count, the number of yards per pound varies from 16 according to one system in use in England, to 4,437,333 yards of silk, according to the Denier scale.

As is well known, worsted yarns are calculated by the hank, of 560 yards, and the number of hanks which weigh one pound avoirdupois indicate the counts. With cotton yarns the count is based upon 840 yards to the pound. Spun silk is calculated the same as cotton, while raw silk has another basis; or, more properly, several bases, the one generally used being what is called the "Denier" method, which is of uncertain origin, the weight of which, according to the London Silk Conditioning House, at 533⅓, is one ounce advoirdupois. Linen is reckoned on the basis of 300 yards to the pound, and woolen yarn in the United States on the basis of 1600 yards to the pound.

We have presented this subject to

a number of manufacturers in the United States, nearly all of whom favor any system that will bring about unification, but the feasibility of it is generally questioned, on the ground that it is seldom advisable to change well rooted conditions of trade for innovations, unless these latter are for overcoming conditions that lead to radical misunderstandings.

F. N. Messenger, agent of the Grosvenor-Dale Company, No. Grosvenor-Dale, Conn., writes us that "There can be no doubt that a uniformity in numbering yarns, as also in all other lines would be a great advantage in international affairs and I suppose that it is now an accepted fact that the metric system is bound to come sooner or later, and its adoption in this particular line, would without doubt be a decided step in advance. Regarding the system of application, speaking purely from a cotton man's standpoint, it seems to me that a uniform length with a varying weight, similar to what is in use now, would be the better thing, thus having the finer counts run in the larger number."

A. B. Sanford, president and general manager of the American Cotton Yarn Exchange, Boston, writes: "Universal thread numbering does seem a move in the right direction and good work would be accomplished and the present methods very much simplified, if we could have one universal standard the world over, never mind what the basis is. Yet it does look to me, so far as cotton manufacturers are concerned, that this change would not meet with their approval. Their system works all right, and applied to such a vast industry as cotton spinning I am of the opinion, they would be very slow to welcome a change, to any other standard from their present system. You will see at once, that it would cause the cotton manufacturers a great deal of disturbance to make this change (or any change)."

Thomas R. Ashenhurst, a well known writer on textile subjects relating to the manufacture of woolen, who has given this subject more or less careful consideration, writes: "The subject is one in which I have taken some interest for a number of years, and realize the advantages of some uniform system of counting yarns. I don't see any reason why this could not be done in countries which have the same system, or basis of weights and measures, as for example, the United States and England, where the yard measure and the pound avoirdupois are in common use. The same would apply to countries using the metric system, but if the metric system be made the basis for universal use exactly the same trouble will exist as at present, only that it would be the English speaking people who would have to adopt a system of weighing and measuring for yarns which would be different from all their other systems, so that the onus would rest upon them of converting the metric to their own systems. If all countries adopted the metric system throughout, the matter would be easy, but until then it is difficult to see how universal counting of yarns can be brought about. Scientific men adopt the metric system generally for the reason that in analysis the percentage is readily obtained, but in ordinary mill or commercial life there would have to be a complete revolution, and a double reckoning made at every stage of the work, or a series of elaborate tables which must be consulted at every reckoning. There is no reason why there should be so many systems in any one country especially as in the woolen trade, but when there are different systems of weights and measures the matter assumes another aspect."

E. W. Thomas, agent of the Tremont and Suffolk Mills, Lowell, Mass., says that he is heartily in favor of such a system, and that "on the decimal basis, No. 1 cotton yarn might be 1000 yards per pound instead of 840. No. 2 twice as many yards, No. 3 three times as many, or 3000 yards per pound and so on. Woolen and worsted yarns to have a basis of 500 yards per pound for No. 1, 1000 yards for No. 2, and so on."

The "Open-Door" Policy.

SOUTH CAROLINA MANUFACTURERS URGE IT.

We publish below a letter addressed by many of the prominent cotton manufacturers of South Carolina to the senators and representatives in Congress from that state, appealing to them for co-operation in calling the attention of congress to the great importance of proper legislation for preserving the "open door" policy in regard to American trade with Asiatic countries. This policy is of vital importance to the textile industries of South Carolina, as a large portion of their product is made with direct reference to a foreign trade, especially that with the Chinese Empire. The manufacturers of that state are anxious that the trade of the United States with Asiatic countries should be placed in the position of "the most favored nation." It is said that not long since a freight train pulled out of Spartanburg with $100,000 worth of cotton fabrics, bound for the market of China. This is an example of what is being done elsewhere in the state. In order to make certain that this "open door" policy shall be a reality, it will require sympathy and co-operation with the policy of England, that is decidedly in this direction, and contrary to that of Russia and Germany. We have nothing to hope for from the policy of any nation other than England, unless it be Japan.

The petition, or letter, of the cotton manufacturers above referred to is as follows:

"South Carolina is now the foremost state in the South in the cotton manufacturing business, not only in spindles, looms, and in number of hands employed, but also in amount of cotton consumed. She is nearly, and before the expiration of twelve months, will be, next to Massachusetts in number of spindles—the second state in the Union in the conversion of the raw material into finished products. The mills of the state on a basis of one million bales per year, consume about one-third of the entire cotton crop of the state, and if present ratio in the increase of spindles continues, it will not be many years before the requirements of the mills will reach the total cotton crop.

"The business of cotton manufacturing is the paramount manufacturing interest of the state. Next to agriculture, it is the principal employment of our people. It returns wages directly to a very large percentage of our population and indirectly it is the support of many thousands more. A large number of the mills in this state are making goods for the China or Eastern trade. If by any chance this demand should be cut off, the mills would be compelled to shut down, or to get into direct competition with the other mills which are making goods for home consumption. You can at once see what the importance of the China trade is to us; it is everything. The prosperity of the cotton mill business of South Carolina depends, in our opinion, upon the China trade. We believe that the expansion of this trade is the hope of the cotton mill industry in the South.

"According to the best of our information the question of the continuance of this trade is a question of policy on the part of our government. Statistics show that 90 per cent. of all the cotton goods exported from the United States to China find a distributing market at the three northern treaty ports of Newchwang, Chefoo and Tientsin. The first named is the treaty port of the great province of Manchuria, already recognized, in the railroad and mining enterprises, as an exclusive sphere of Russian enterprise. The second is the treaty port of the province of Shantung, in which Germany claims exclusive privileges similar to those conceded to Russia in Manchuria. The third is the treaty port of the metropolitan province of Chili and is the maritime gate of Peking. All three are situated within a comparatively narrow area, but through them is done most of the foreign trade of North China. It only

requires one step forward in the extension of the authority of Russia and Germany to destroy the terms of equality on which the commercial nations of the world participate in the advantages of Newchwang and Chefoo, and the movement on Peking, which is generally assumed to be part of the policy of Russia, would necessarily threaten the commercial interests which centre at Tientsin. Up to this time, we are informed that pressure brought by the governments of Great Britain and the United States has led Russia to declare its purpose to admit the merchandise of other nations into Manchuria on terms of equality with its own, but it is impossible to say how soon that policy may be changed. It is alleged that in the importation of railroad and other material, Russia entirely disregards the Imperial Chinese customs of Newchwang, regarding the port as if it were already in a Russian possession; and it may be that Russia, for the protection of its own trade, may see fit to carry this discrimination to the point of imposing her own custom duties of American cotton goods. In such an event, our trade with Manchuria would be seriously handicapped, and might, conceivably, cease to exist, as did our trade, under like circumstances, with Madagascar.

"The effect of this would be a far-reaching one to the cotton mill industry in the South. Up to this time, the Federal Government has shown a disposition to insist on the maintenance of its treaty rights with the Chinese Empire, whenever there seemed any danger of their positive infringement. But, as we have indicated, the process of substituting for the authority of the Chinese government the jurisdiction of a foreign power, is a gradual and insidious one, and its completion would mark the disappearance of all pre-existing treaties. We are, therefore, led to believe that equality of commercial opportunity in China can be maintained only by a decided stand in the interest of their trade on the part of the nations who have most to lose by the creation of spheres of exclusive commercial influence, and that any effective assertion of treaty rights must involve the stability of conditions now existing. When you consider the vital interest of your constituency in this question, we feel certain that you will deal with it in the way best fitted to bring about a satisfactory solution. In our opinion, this can be most easily reached by supporting any line of policy of the Federal Government based upon the strict observance of our treaty rights in China; or which, in other words, insists that no part of that Empire should be subject to the influence of any Government without giving to the United States equal commercial rights and privileges with the most favored nation. As we understand the situation, the question of the expansion policy of the government is in no way involved. The maintenance of our rights in China does not include an attempt to bring other countries under the influence of our flag. The open and declared purpose of those who are solicitous about these rights is that in all questions of trade and commerce this country shall be put on a parity with its rivals in the far East. This is not a question of territory; not a question of empire; but simply a question of trade and of the right that our people now enjoy to conduct a profitable commerce with the Chinese Empire in any portion of its territory. All that we demand is perfect equality with other nations.

"We write this letter with the urgent request that you will use your influence to insist upon a policy on the part of the Federal government which will secure the results above outlined. We believe that the policy of the Federal government should be such that while it demands nothing in concessions, it requires everything in the equality of trade, and such protection to our commerce which will not make it depend upon the whim or selfishness of any other foreign power. We recognize the right in other people to protect their own interest, but we do

not recognize the right in the dismemberment of a friendly power to shut us out entirely, where under agreement already made with such power we are full protected, and have equal rights with other people. Whether we should trade or not with a friendly power should not depend upon the verdict of our rivals in trade, but the merit and result of that rivalry should depend upon prices, and not upon policy. Given the open door, we have no fears as to the result or as to the future prosperity of our commonwealth."

This petition has been signed by all of the leading cotton manufacturers of the State, some of whom have written us; among them we give the views of two who have addressed us—Ellison A. Smythe, of the Pelzer Manufacturing Company, and Col. James L. Orr, of the Piedmont Manufacturing Company.

Capt. Smythe writes as follows: "I agree heartily in the general proposition contained in the letter, and think it of the utmost importance that the United States government should very promptly and firmly indicate its position in reference to the open door with China. I do not believe it is too late, but I believe such action should be taken by our government at once."

Col. Orr expresses his opinions as follows: "The petition which the manufacturers have sent to the Senators and Representatives of South Carolina fully expresses my views as well as my anxiety that the government shall not allow the Chinese Empire pre-empted by the European nations. The United States have increased their exports to the Empire very largely, and all must recognize that with our largely increased productions, these outside markets are necessary, even for our present capacity; and the future of the coarse goods mills depends entirely upon this trade. Russia and Germany are increasing their influence over large areas of the Empire; and their course will undoubtedly be to exclude exports except from their respective territories. Now my humble judgment is that unless the United States government takes a firm stand on the question of open ports and sustains England in this contention both countries will be crowded out of this most valuable trade. Your journal has great influence with the manufacturers of the whole country, and I sincerely hope you will use your best efforts to arouse them on this subject."

The New Bedford Textile School.

ITS DEDICATION AND OPENING EXERCISES.

The New Bedford Textile School, New Bedford, Mass., was dedicated and opened with appropriate exercises Saturday, October 14. There was a large number in attendance, including many from surrounding places. More would have been present, together with the governor and other state dignitaries, had it not been for the public reception that was being given to Admiral George Dewey, in Boston.

The exercises of the day were formally begun at eight o'clock in the morning, with the raising of a beautiful American flag, the gift of Herbert E. Walmsley, agent of the Wamsutta Mills, and one of the board of trustees.

Most of the invited guests made their appearance about noon, admission being obtained by card. Most polite attention was extended by the officials. All of the machinery in the school was in place, and the class rooms were ready to receive students when the actual school term began. The guests, numbering 200, including the overseers from local mills, representatives of the city and the labor unions, were provided with a lunch in the upper room of the school building. While this was being served, an orchestra greatly contributed to the pleasing features of the occasion with appropriate music.

After lunch, public exercises were held in the City Hall, the meeting being presided over by George E. Briggs,

president of the textile school corporation, to whose energy the people of New Bedford are indebted for the completion of the school at this time. In the president's introductory address, he said:

"One of the worst evils that the United States of America is suffering from in my opinion is poor workmanship. Good men were never so scarce in trades of almost every calling as they are today. I don't say that we don't do much good work, but we do altogether too much poor work.

"The utter lack of even a semblance to an efficient apprenticeship system must be held responsible for these unsatisfactory conditions. Fifty years ago there were opportunities for boys to learn trades. There are practically none today. An incompetent workman is not only a burden to himself and his employer, but also to his more fortunate fellow workman who can do his work well. The first is generally overpaid; the last most always underpaid. As a good cash customer has to pay enough for his goods to make up for losses by the man who never pays his bills, and as the careful tenant who seldom calls for repairs must pay for fitting up the house of his destructive neighbor, so must the good mechanic or operative build his house or weave his cloth cheap enough to make good the losses occasioned by poor weavers or carpenters or masons who break machines, waste stock and require constant supervision, to say nothing of ruining the dispositions of their employers. Poor workmanship, although alarmingly prevalent, is fortunately not an incurable disease. The textile school is here to apply the remedy."

Mr. Briggs gave an interesting statement of the finances of the school, as follows:

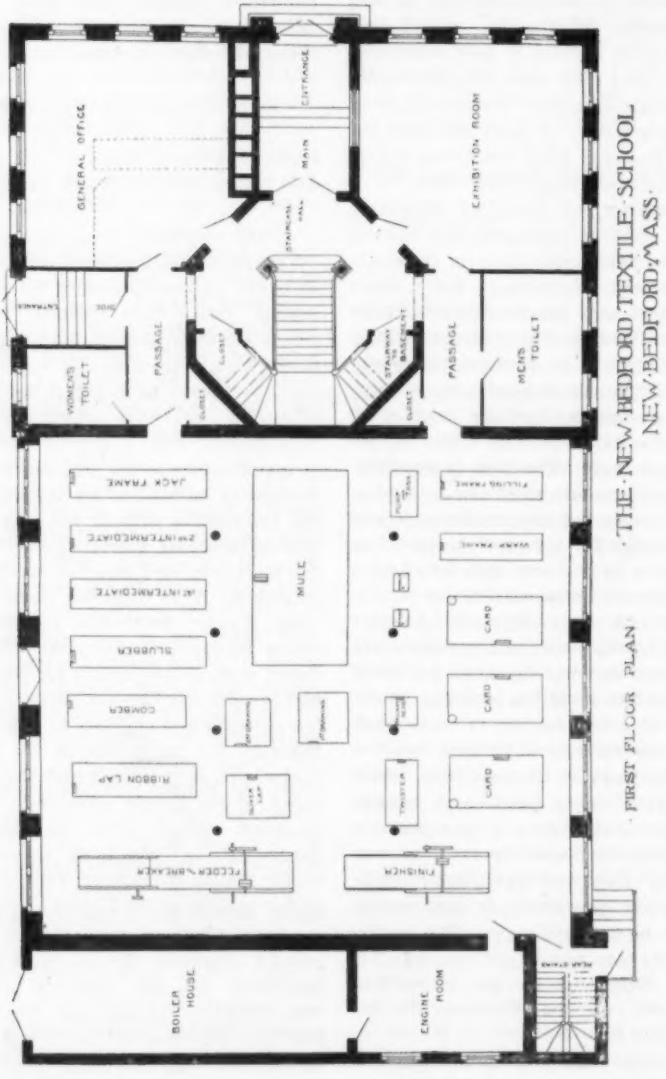
The state and city each furnished $25,000, which, with accrued interest, has given the school an available sum of about $52,000.

With a few bills yet to be rendered, for which a liberal estimate is made, the total cost of the institution has been:

Land	$8,000
Building	26,824
Equipment, including boiler, engine, hand looms, freight, installing machinery, furniture, educational appliances, etc.	5,200
Salaries	3,568
Catalogues, advertising supplies and all other expenses	2,538
Total	$46,530
Balance unexpended	$5,470
Add tuition fees receivable	1,300
Cash available	$6,770

The Hon. William W. Crapo spoke on behalf of the trustees of the school, saying that, "the purpose which prompted an appropriation of public funds from state and city was to secure, by means of a higher technical education, increased effectiveness of management and improved methods of manufacture in the greatest of Massachusetts industries. By supplementing the routine drill of the mill with critical technical, special knowledge of the materials used and the machinery employed, it is believed there will come greater perfection of product, easier methods of operation with reduced cost, better wages for workers and broader markets for goods. In giving strength and stability to this great industry the prosperity of the Commonwealth is promoted and the well-being of its people advanced. New England takes pride in leading the rest of the Union in the magnitude of its textile machinery and the superior quality of its fabrics. Steadily we have advanced until we are prepared to challenge the old world in the excellence of our products. Shall we maintain the position we have gained? Within recent years a new factor has appeared. The South, stimulated by our success and eager to share our prosperity, has entered the field as a competitor. Southern manufacturers claim an advantage over us in their nearness to the cotton and coal fields, which furnish them with raw material and fuel at a lower

cost than we can obtain them. We concede the advantage which location rightfully gives to them. They claim a further advantage by reason of their longer hours and cheaper labor. While



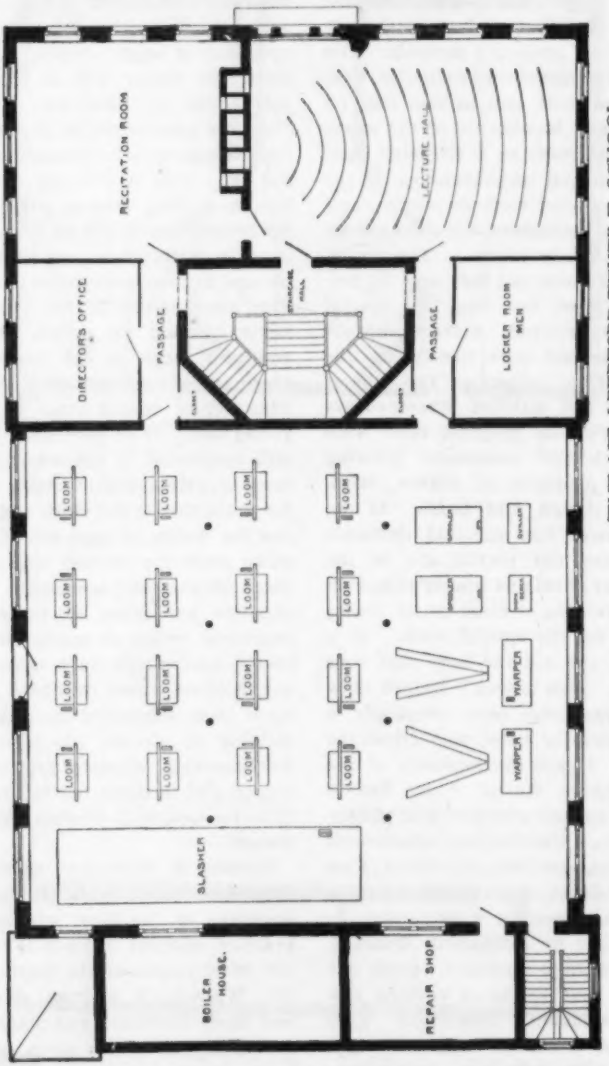
recognizing the facts, New England does not propose to lengthen hours or lessen wages. And if, as they assert, we are handicapped by excessive and unequal taxation, and by unwise legislation, which repels capital and impairs individual independence and undermines individual responsibility and ambition, we answer that these conditions are of our own creation and within our power to remedy whenever so disposed. But how are we to meet and overcome natural external adverse conditions? How are we to retain leadership in spite of disadvan-

tages? I see only one way, that is through the superior intelligence and ability of the men who direct the management and the superior proficiency of the men who handle the machinery and perform the work in our factories. What is required is the highest skilfulness, the most perfect machinery and the best economic methods. The demand for increased production with diminished cost can be met only by the skill and intelligence of the workers. There must be a thorough comprehension and understanding of the various complex methods which enter into the manufacture, acquired not by imitation but by reason. The craftsman must know not only how to perform his task but why the special process is required. Science and art enter more and more closely into the conduct of our industries. The days of contented and satisfied ignorance are past. Industrial progress must keep pace with the constantly growing call for products of higher excellence in design and finish. If we are to meet the manifold demands made upon the textile art in the creation of novel and beautiful and attractive fabrics, it must be by brains educated for the special work. It is the mind and not the body that does the work. This means a trained body of workers, and more especially a trained body of those who direct the workers. Hence the necessity of the textile school, out of which are to come the trained workmen and educated experts. Uneducated, misdirected labor is comparatively worthless. Fine yarns are not made from waste or shoddy, and perfect workmanship is not wrought by indifferent, ignorant, aimless, shallow workmen. Some one has said that genius is nothing else than continuous, downright hard work, and it can be truly said that skill is not the child of accident or random, hap-hazard fortune, but is born out of definite preparation and determined purpose. Native ingenuity is not sufficient. Systematic instruction in school and shop furnishing a stimulant to original and inventive thought is a necessity in modern industry. What this institution needs and what it asks for is the sympathy, the encouragement and the good word of this community. We deem its success essential for the present, as well as the future prosperity of our city. We ask, too, the active interest and cooperation of eager, earnest, inquiring, ambitious young men to whose use this school is dedicated. We offer them the opportunity to fit themselves for the highest accomplishment in textile art. This is a world of competition, and every man is pitted against his fellow. The prizes go to those who excel in faithfulness and skill. Capable and fit men are always in demand. The most skilful in his vocation is never hunting for a job. The best equipped forge to the front, where there are always places to be filled. This school means much to many a young man. If he goes from it to the mill instructed in the scientific problems of cotton manufacture, he bids for promotion at the start, and he lessens the weeks of apprenticeship. He gains profit for himself while society reaps an economic advantage. Massachusetts has much at stake in the enormous outlay of capital in factory plants, and in the many thousands of her children whose livelihood depends upon their successful operation. In striving to elevate the standard of workmanship, whereby to protect her capital and to uplift her labor, Massachusetts acts with wisdom and beneficence."

Herbert E. Walmsley, agent of the Wamsutta Mills, spoke as the representative of the local mill men, the practical element which is to later feel the effectiveness of the textile school. Mr. Walmsley's address was easily and finely delivered, and made a most favorable impression upon his audience. Among other things, he said:

"It is commonly stated abroad that American manufacturers cannot produce goods which can compare with the goods of foreign make, in quality, tastefulness of weave, and finish, until such times as greatly increased fa-

cilities are afforded in this country for the acquisition of special technical knowledge. It is a familiar fact that high manual efficiency is found in those only who have had the advantage of a thoroughly practical training, during the earlier years of life. To the young artisan there is little doubt that instruction which serves to exercise the hand and the eye is most valuable as tending to create aptitudes and to develop manual dexterity and manipulative skill; proper preparation for life among those occupied in productive industry. In one word, technical education means an actual and prompt money result in the rising value of labor, and every intelligent workman will, it is believed, be eager to avail himself of the grand opportunities for self-improvement which this institute is designed to afford. Every man in the industrial order owes it to himself and the community



·THE·NEW·BEDFORD·TEXTILE·SCHOOL·
NEW·BEDFORD·MASS·

·SECOND FLOOR PLAN·

to improve his condition by all legitimate means. In the struggle of life no allowance is made for ignorance. The disappearance of the unfit is inevitable. The students of this school will most assuredly be the overseers, superintendents and manufacturers of the future—this I say deliberately. It is not to be forgotten that this institute will, we anticipate, be attended by many young men who have probably spent their whole day at work in the mill—all honor to them—and who are therefore entitled to recreation as well as instruction. Work, education and recreation go hand in hand; they mutually supplement and help one another, and it is hoped that this institute may prove to be not alone a place for instruction, but a centre of rational and intellectual life. Regarded from the economic or industrial point of view, how vitally important then is this question of technical education, and I will say right here that it is to variety, originality, and true excellence we must look in New Bedford, if we are to maintain and increase our reputation as a cotton manufacturing centre; hence again the urgency and importance of these educational institutions."

Remarks were made by others, including Hon. H. W. Knowlton, ex-Mayor David L. Parker, Rufus A. Soule and Samuel Ross, secretary of the Mule Spinners' Union.

The equipment of the building, both mechanically and educationally, including the power plant, electric lighting and humidifying, was installed from the plans, and under the direction of Managing Director C. P. Brooks.

The architect of the building is Nat C. Smith of New Bedford. The contract for the erection of the building was executed by J. W. Bishop & Co., Worcester, Mass., and the president of the school has given personal attention to the supervision of the work throughout the whole time of the erection of the building, and the managing director to the installing of the mechanical and educational equipment.

The school building is a spacious brick structure, centrally located, on the principal business street of the city, and is the first building erected exclusively for the purpose of a textile technical school in the United States. Its style of architecture is the old colonial. The accompanying illustrations show plans of the first and second floors, the latter being practically a duplicate of the former. The third floor is devoted to the designing and hand loom weaving departments. The main building is 64 by 100 feet, and has an annex in the rear, 12 by 57 feet, for the engine and boiler rooms, with a rear staircase reserved for use in case of fire. The power for the machinery is derived from a 40 H. P. engine, built by the Buffalo Forge Company, Buffalo, N. Y.

Donations of machinery and supplies are as follows:

A. T. Atherton Machine Co., Pawtucket, R. I., 1 combination feeder and breaker.

The Atwood-Morrison Co., Stonington, Conn., 1 silk quiller.

American Moistening Co., Boston, Mass., a complete humidifying apparatus.

American Supply Co., Providence, R. I., supplies.

Crompton & Knowles Loom Works, Worcester, Mass., looms.

Covel & Osborn Co., Fall River, Mass., mill supplies.

Dobson & Barlow, Ltd., Bolton, Eng., per Stoddard, Haserick, Richards & Co., Boston, Mass., 1 jack frame.

Draper Co., Hopedale, Mass., 1 spooler, 1 warper, 1 twister and 1 loom.

Dixon Lubricating Saddle Co., Bristol, R. I., supplies.

D. T. Dudley & Son Co., Wilkinsonville, Mass., hand loom shuttles.

T. C. Entwistle, Lowell, Mass., 1 warper.

Excelsior Loom Reed Works, Pawtucket, R. I., reeds for all looms.

Felton & Guilleaume, Carlswerk, Mulheim, Germany, 30,000 wire heddles and 300 shafts for same.

Factory Insurance Co., Hartford, Conn., sets of mill plans for students.

General Fire Extinguisher Co., Providence, R. I., complete equipment for fire protection.

J. Hetherington & Son, Manchester, Eng., per William Firth, Boston, Mass., 1 comb and 1 sliver lap machine.

Howard & Bullough American Machine Co., Pawtucket, R. I., 1 finisher lapper, 1 card, 1 drawing frame, 1 second intermediate, 1 spinning frame, and 1 cone winder.

Kilburn & Lincoln Co., Fall River, Mass., 1 loom.

Lambeth Rope Co., New Bedford, driving ropes.

Laminar Fibre Co., North Cambridge, Mass., cash donation.

S. C. Lowe, New Bedford, mill supplies.

Mason Machine Works, Taunton,

Mass., 1 card, 1 railway head, 1 ribbon lapper, 1 mule and 2 looms.
Metallic Drawing Roll Co., Indian Orchard, Mass., metallic rolls for drawing frames and comber.
John Omerod & Son, Castleton, Eng., roll leather.
Providence Machine Co., Providence, R. I., 1 first intermediate.
E. H. Pierce, New Bedford, mill supplies.
A. W. Perkins Co., concreting 170 feet.
Saco & Pettee Machine Shops, Newton Upper Falls, Mass., and Biddeford, Me., 1 card and 1 drawing frame.
Nat. C. Smith, architect, New Bedford, Mass., the building plans.
Stoddard, Haserick, Richards & Co., Boston, 2 looms.
Thayer & Co., Incorp., Boston, donation.
Universal Winding Co., Boston, 2 winding machines.
Union Belting Co., Fall River, all belting required.
Fall River Bobbin & Shuttle Co., Fall River, bobbins and spools.
Whitin Machine Works, Whitinsville, Mass., 1 spinning frame, 1 reel and 1 loom.
Woonsocket Machine & Press Co., Woonsocket, R. I., 1 slubber.
Woonsocket Reed & Shuttle Works, Woonsocket, R. I., shuttles.
W. R. West, New Bedford, roll covering.
New England Cotton Manufacturers' Association, Boston, a file of the transactions of the association.
Jones & Laughlins, Ltd., Pittsburg, Pa., shafting and pulleys.
American Woolen Co., Boston, warp and filling.
American Card Clothing Co., Worcester, Mass., hand cards.
DeWolf & Vincent, city, hardware.
Easton & Burnham Machine Co., Pawtucket, one spooler.
S. A. Felton & Son Co., Manchester, N. H., assortment of brushes.
Grinnell Mfg. Co., city, bobbins, warps and filling.
National Ring Traveler Co., Providence, R. I., assortment of travelers.
Potomska Mills, city, supply of warps, bobbins and laps.
Parkhill Mfg. Co., Fitchburg, Mass., 1 warp and filling to weave same.
Wamsutta Mills, city, 1 bale cotton.
Seth Wilkinson, Pawtucket, R. I., supply of cleaning cloths.
N. B. Paper Co., city, tubes.
Elijah Ashworth, Fall River, card clothing.
H. E. Walmsley, American flag.
Pierce Manufacturing Corporation, warps, laps and filling.
E. H. Pierce, mill supplies.
Charles S. Knowles, rubber mats.
Arlington Mills, Lawrence, 1 warp.

The whole of the above machinery is absolutely modern, being constructed especially for the school.

Instruction will be given both in the day and evening, moderate fees being charged for the courses. Evening instruction, similar to the day courses, on the same machinery, and by the same teachers, will be given for the benefit of workers in mills and machine shops, who cannot spare the time and money for day courses.

The day courses of instruction are five in number, as follows: General Cotton Manufacture Course; Weave Mill Superintendent's Course; Designer's Course; Mill Engineer's Course; and one suitable for men intending to hold a position in a dry goods commission house. An additional course is in preparation for the superintendency of a yarn mill. It is intended that no one of these shall occupy more than two years to complete, while some of them only occupy one year.

Those interested in the school should write to the managing director for a catalogue of the school for 1899-'00.

The "Hurricane" Truck Yarn Dryer.

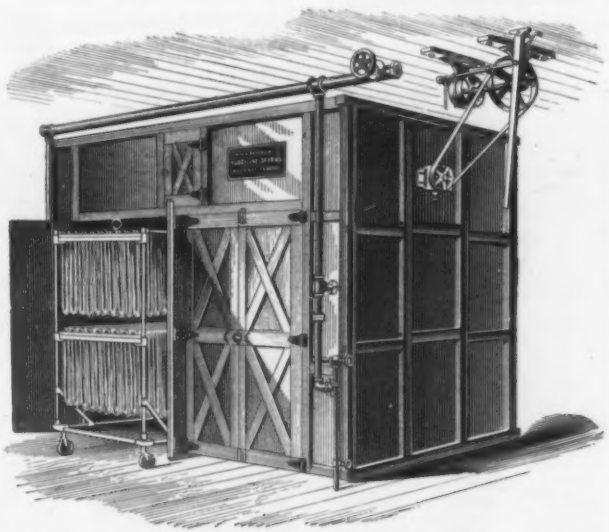
In order to dry yarn or any other material properly, it is important, in the first place, that the temperature shall not be sufficiently high to injure the quality of the material. It is a well known fact that all materials in the open air dry much more rapidly in the spring, when the weather is bright and cool, but with a good, strong breeze blowing, rather than in the summer, when the air is hot and sultry. The reason for this is evident when it is remembered that even cool, dry air, if moved rapidly through the material, will absorb and carry off considerably more moisture than a motionless atmosphere at a high temperature.

This principle of rapid air movement has been applied with great success by the Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, in their "Hurricane" dryers, of which the truck system for yarn drying is here illustrated.

The yarn is poled, placed on the trucks and wheeled into the dryer, where the air is recirculated in large volumes alternately through the wet yarn and the steam coils, the latter being located on each side of the machine. While the greater part of the hot air is thus recirculated over and over again, by means of a small opening at the top of the machine the surplus moisture is driven off and car-

ried away through an ordinary sheet iron pipe. In this way the air is maintained at the proper point of humidity for most economical drying and the greatest amount of work is done with the least consumption of steam.

As the air is drawn up through and in between the yarn, it is claimed the skeins dry thoroughly around the poles, and special means are provided so that the entire truck load dries uniformly. In this construction, the steel-blade fans are mounted on a horizontal shaft, which extends to the outside of the dryer and has a pulley



attached. This ensures a system of direct driving from a countershaft overhead with its consequent advantages. The fans which are of the "right hand" and "left hand" pattern respectively, are mounted on the same shaft and, as they are a considerable distance away from the yarn and the bearings do not overhang the latter, there is no danger of the yarn catching in the fans or of having grease or oil drop on it, special means being provided to give positive oiling and ensure cleanliness.

Extra trucks are provided with the machine, and, as soon as one truck load is dry, it can be drawn out, thus avoiding all danger of the yarn baking, and another truck is wheeled in.

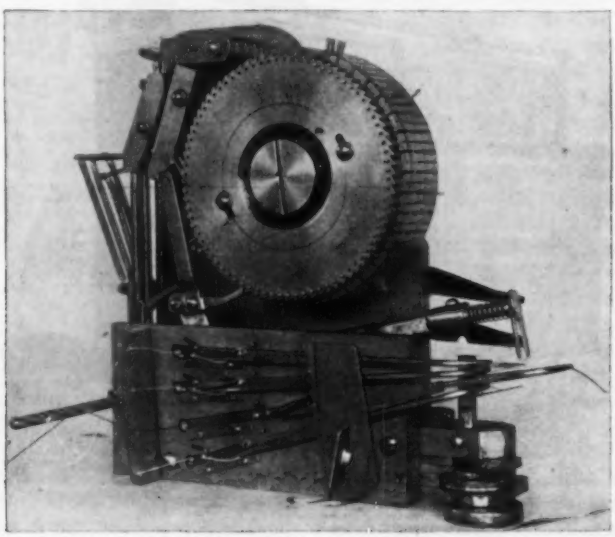
A feature of this system which is called to our attention is that even when the doors are opened, hardly any heat escapes from the dryer, permitting the machine to be located in the same room with other machinery, without causing any appreciable difference in the temperature of the room.

Other claims for advantage are the small amount of labor required, together with the savings in steam, power and floor space, and the comfort for the operative. The truck system is particularly adapted for yarns, warps, wicks, braids or piece goods, when drying from 500 pounds to 5000 pounds per day, but for larger quantities, special forms of automatic dryers are built by the company. In their Automatic Yarn Dryer, the yarn is carried through continuously on poles by means of special chain conveyors with roller bearings, the air being recirculated through the yarn as it travels forward through the machine. This latter machine can also be equipped with their "Extension" attachment, by means of which an elevator is frequently dispensed with, and the "feeding" or "delivering" can be done on another floor than that on which the main body of the machine is located.

White's Four Color Striper.

Some time ago, mention was made in these columns of an improved striper which was in process of development by A. White, 8 Western Ave., Lowell. Since that time the machine has been greatly perfected and many changes made and patents allowed.

The illustration shows the device separately from the machine, but in order to understand its operation to best advantage, it should be seen in practical use, and the observer cannot fail to be impressed with the efficient manner in which it accomplishes its purpose. The cut, however, shows



that it is neat and compact and without any delicate or complicated parts. It handles two, three or four colors, as may be desired, and any yarn that can be knit, including thread, silk, lisle thread, cotton and worsted, singly or together, as it has been found to work well on both single and double yarn.

The feeding device is quite novel. The delivery of the ends of the yarn to the loop wheel is accomplished by a small jet of air in a most ingenious manner. This feed seems to be positive, and does away with complicated and delicate mechanical motion, and is operated by simple means. There is no holding device required to hold the threads when out of work, and the method of feeding does not put any tension or strain on the yarn at any time. The cutting is done with shears so arranged and designed as not to tighten the stitch. The different yarn carriers deliver the yarn at exactly the same point on the loop wheel, and the cutting out device is timed to work at the right moment. The yarn carriers can be easily and quickly removed at any time and threaded.

The pattern wheel is a wonderfully ingenious device, and permits the widest range of work in making up a pattern. For instance, the same pin can be used in the same hole to throw the yarn either in or out of the work, while at the same time a pattern of any number of courses, from 40 to 80, can be put in and striped throughout the whole.

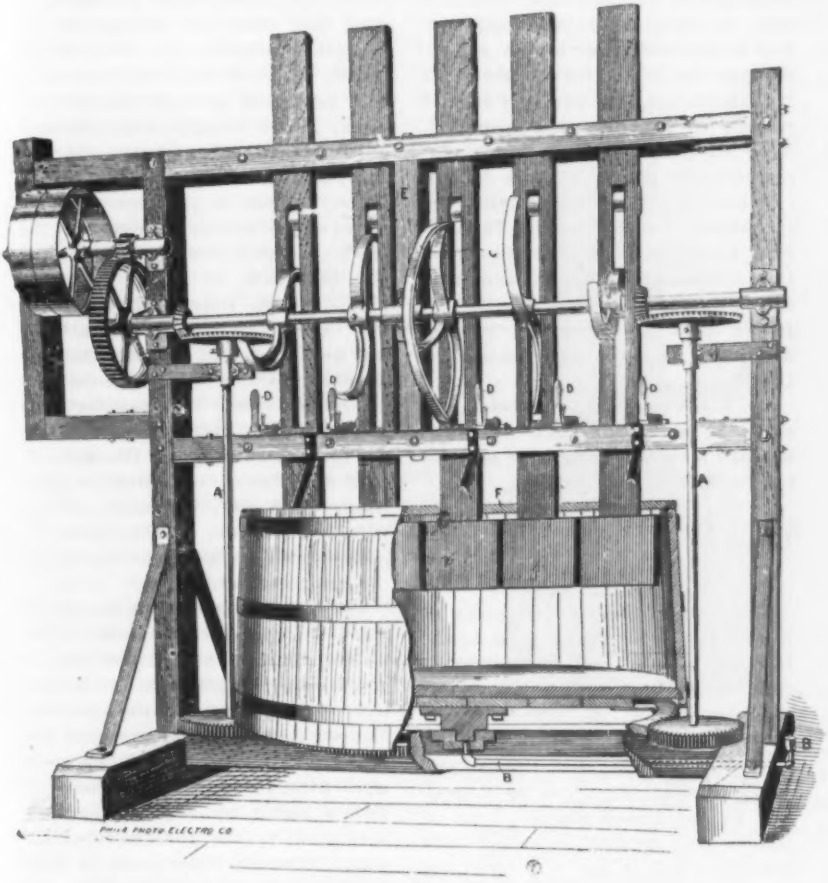
The device works easily, with no apparent jar, and is almost noiseless.

The Otis Co. at Ware, Mass., are running these stripers on 22" heads at 42 revolutions per minute, and we understand that they are doing satisfactory work.

Mr. White seems to have been successful in producing a machine which the market has demanded for some time; i. e., a satisfactory four-color machine for spring needle work.

Improved Tom Tom.

The accompanying illustration shows a machine built by H. C. Weihe, 2731 North Sixth St., Philadelphia, which is in extensive use in dye-houses, woolen mills and hosiery mills. The illustration shows very clearly the operation of the machine.



TOM TOM.

Among its features of excellence, special note is made by the builder of the following points:

(A) Double upright gearing making motion of tub uniform and relieving all strain which was the trouble with the old style single gear.

(B) The attachment for greasing center-bearing of tub. By the old method the tub had to be removed when grease was required. By this method, all that is necessary is to give the cup a turn, which forces the grease to the bearing.

(C) The centre cam which is made large and single so that the centre plunger only operates once while the others are plunging twice, thus giving the goods on outside edge the same amount of working as those in centre.

(D) Catches to hold plungers when not in operation; this is an automatic device used when putting in or taking out goods, and is so simple it can be operated by a child.

(E) Centre steady bar making the frame much stronger and steadying the main shaft, which was a great drawback to the old style machine.

(F) Lid to tub. This is an improvement, as it keeps the liquid confined and avoids all splashing around the machine. There are also friction plates on the plungers to prevent wearing, and large castor rollers under the tub to keep it steady while revolving.

The machines are made of the best material and are thoroughly strengthened in every point that experience has demonstrated of value. A five-plunger machine, such as shown in the illustration, will dye or wash 250 pounds of goods in one operation. They are made also with four plungers and upwards, as large as desired.

A number of the leading dyeing establishments in and around Philadelphia have these machines in operation, among whom may be mentioned the Franklinville Dye Works (4), Brown Bros. & Alberle (3), Thomas McCawley (2), and the Continental Dye Works.

Mr. Weihe also builds oxidizing and chroming machines for fast black dyeing, and makes a specialty of machinery for this class of work.

The Paris Exposition.

NO BOYCOTT.

Major Fred. Brackett, secretary of the United States Commission to the Paris Exposition, has just returned from an official visit to Paris. When recently seen at the offices of the United States Commission, New York, he said: "I heard a good deal in Paris of the proposed boycott of the Exposition by the United States. I am of opinion that nothing connected with this affair will in any way affect the success of the Exposition. There are a few people in and on the Continent who would like to have the United States stay from the Exposition, but they will not be gratified. I was informed in Paris that seventeen exhibitors from England had withdrawn on account of the Dreyfus verdict. As England will have over 2000 exhibitors at the 1900 Exposition these withdrawals do not affect the total result. In fact, England, like the United States, has not the space to satisfy the demands for it, and any vacancies by withdrawal are speedily filled by other applicants. I did not learn of any withdrawals of exhibitors from other countries, and I do not believe there will be any. The French Exposition authorities were, of course, a good deal disturbed because of the suggested boycott in the United States, but they concluded, and rightfully as results have shown, that the people in this country who advocated a boycott did not represent the majority or the real feeling in the United States. There is just now a great struggle among the nations of the earth for commercial supremacy, and the battlefield is to be upon the grounds of the Exposition at Paris in 1900. Americans must be prepared for this fight and send to Paris the best possible products of our shops, factories and farms. The manufacturers and producers in the United States are too shrewd to ignore this magnificent opportunity to advertise their wares for a mere sentiment. There will be no boycott, and the Paris Exposition will be the great wonder of the dying century."

As to the progress of the Exposition Buildings Major Brackett said: "The United States National Pavilion is progressing satisfactorily and soon will be under roof. It will be a very handsome and imposing structure and in every way creditable to this country. Strange to say, however, the United States building will be overshadowed by the pavilion of Italy, which is nearly three times as large as that of this country. All the palaces and buildings in which exhibits are to be displayed will be completed on time. Some of the smaller national pavilions may not be completed by the opening day, but this will not change the general result. The Exposition will be held upon grounds which are virtually located in the very heart of Paris. The exterior lines

which border the area devoted to the Exposition resemble a bell, the larger diameter of which is 8400 feet and the smaller or upper part 4200 feet. Out of the interior, however, comes an irregular space 4000 by 3000 by 2000 by 1500 feet, an area of, say, six million square feet, which is covered by dwellings and stores, thus making the grounds irregular in form, the same being 4000 feet long. The 'tout ensemble' of the Exposition will be disappointing to those who attended the Chicago Exposition, for nowhere on the Paris Exposition grounds, except on the Alexander Bridge, will there be a vista embracing massive structures such as we expect to see in an international exposition. With only an open promenade on the Esplanade, narrowing down to a space 100 feet wide, and another on the Champs de Mars of a uniform width of 500 feet, together with a narrow connecting link on the Seine, the grounds and buildings will be far from comfortable when they hold the immense throngs that will visit the Exposition. But, as the Paris Exposition is arranged, the visitor will see, under what will be practically one roof, a greater variety and display of the world's products than has ever before been grouped together in any exposition the world has known. President Loubet is taking a deep, personal interest in the Exposition, and has urged the French Commissioners to exert themselves to the utmost to show the world in 1900 that France is still a strong, laborious, united nation, and that she has not been affected by fleeting quarrels."

—Importers and manufacturers no longer work by the old-established rule-of-thumb methods. Every article of Nature's gift or of human product must now be tested and analyzed for the purpose of finding out its real value on the one hand, and on the other the extent of its adaptability for the purpose to which it is to be put.

Telephone Equipment.

The use of telephones is becoming more and more general in mills and factories, and manufacturers are paying special attention to instruments for this class of work.

The illustration shows a long distance telephone manufactured by the Mianus Electric Co. of Mianus, Conn. It has the long distance arm transmitter and three cell battery, and is designed for first-class service. All instruments made by this company are equipped with standard 10,000 ohm magneto bells unless otherwise ordered, and their telephones are modern in construction and guaranteed to be thoroughly reliable.

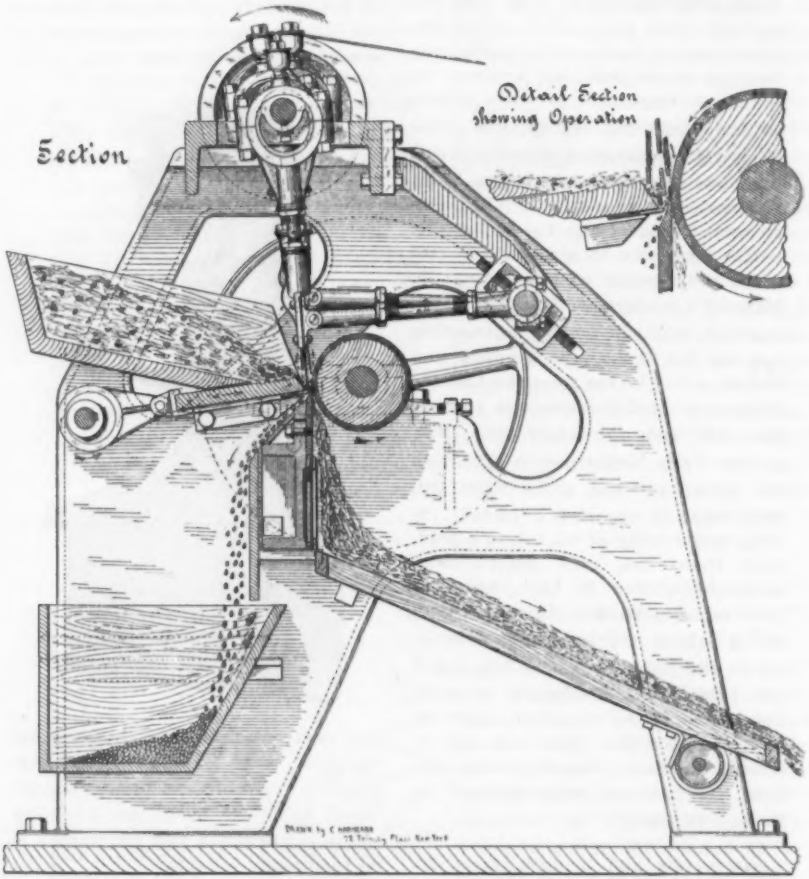
This company also makes a specialty of telephones for short distance and interior use for factories and public buildings, and their prices are very reasonable and within the reach of all.

They issue a complete illustrated catalogue containing a list of a very large line of electrical supplies, which will be sent on application.

Cotton Ginning.

Paper read by J. E. Cheesman, New York City, before Montreal meeting of the New England Cotton Manufacturers' Association.

Since 1854 roller gins have been in use in this country on Sea Island cotton, but have been deemed impracticable for Upland because of small capacity.



MacCarthy was the first man to conceive the combination of a roller, a stationary blade and a movable stripper, and in 1854 he secured a patent covering these features. Today this gin, with virtually no improvements, is in use in the Sea Island field, as well as in India and Egypt. It is the "stripper" which has been the principal obstacle to the success of roller ginning. A long blade sharp at the edge, running up and down in a straight line, in close working contact with a stationary surface, passes the exposed surface of the roller so closely and goes beyond the edge of the guard so far that the feed is shut off half the time. Such a stripper, going up and down in the same plane, carries the cotton seed and fibres with it and on the downward stroke rubs the cotton on the surface of the guard, causing abrasion of the staple and often striking fire. The one piece stripper such as is employed in these gins cannot be made longer without losing its rigidity, therefore, the size and capacity is unalterably fixed.

The Cheesman Roller Gin we believe overcomes the faults in the present roller gins. Its capacity is two or three times greater and there is absolutely no danger of fire and no injury to the staple. This roller gin works upon a new principle, that of a divided stripper, the edge of which is blunt instead of sharp. The stripper blades are fixed upon the driving shaft in thirds or fifths, traveling independently of each other, thereby destroying the vibration and causing the seed to leave the cotton more quickly than is possible by any other method. These strippers by means of an elliptical motion handle the cotton so deftly that the result closely resembles the work of hand ginning, and herein is the secret of success, ginning cotton quickly, with absolutely perfect fibre, free from dust and trash. With this gin the working of the stripper edge is that of an ellipse. Starting from the highest point it describes the beginning of an inside curve as it approaches the cotton held by the roller, gets back of the seed, and, as it nears the guard, continues its curve downward and outward, taking the seed with it in a rolling motion. It is this outward motion, away from the guard, that prevents the rubbing of the cotton fibre against the hard surface of the guard, to its certain injury and the breaking of the seed. The fibre coming from this gin is straightened by the operation, having no twists or kinks. The adjustment of the speed of the roller to the speed of the strippers has been carefully worked out to this end.

The construction of this machine is such that any size of gin can be furnished to meet the requirements of capacity and thus the main objection hitherto made against roller gins is overcome. I have been told that the spinners desire cotton to come to them in a state as nearly like that of the cotton when picked as possible. This the Cheesman gin accomplishes, as no brush, cleaning device, or condenser is used, the cotton coming from the gin in a bat ready for the press. This may seem to you a fairy tale, but we are prepared to show the results of the most careful and searching examination of cotton experts in proof of our statements, and we shall be glad to furnish you ample opportunity to make further tests yourselves in your own mills. It is claimed for this gin utmost simplicity in construction and running (so that skilled mechanics are not essential to its operation), automatic feed, a saving of labor, great saving in horse power, large increase in quantity with perfect quality, clean seeds (doing away with cotton linters), and safety from fire. The gin has had its test in the field and is, therefore, more than a suggestion, it is a fact. They are being manufactured, and this fall will find them distributed through the cotton states where the longer fibres grow, and ginning, we hope, enough to have the fibre tested by such spinners as care to try it. We feel at last that we are coming to better things in the world of cotton. If the spinner demands it, he can have perfect lint, for the means to obtain it is at hand.

Khaki.

The subject of khaki cloth for the clothing of our soldiers and marines has been one of considerable interest to our cotton manufacturers, and one that we have frequently alluded to in past issues of this magazine, notably: in February, page 34; March, page 36; September, page 27; October, page 42.

The manufacture and use of khaki is of so much importance that we think our readers will be interested in the following, taken from the London Telegraph:

"Without proper clothes a man cannot fight to the best advantage, a fact which the military authorities have borne carefully in mind as regards the soldiers intended for service in South Africa. The tight-fitting, costly uniforms in which Mr. Thomas Atkins appeals so strongly to the feminine portion of our population are the outcome of much artistic effort on the

part of military tailors, and are admirably adapted to the piping times of peace; but when the day arrives for service in Africa, or in any other part of the world where excessive heat is likely to enfeeble the men, the gay trappings must be laid aside in favor of more suitable material. That is the reason why our soldiers during the present campaign will wear the dark, fawn-colored 'drill' familiar to most people as 'khaki.' It is made of cotton thread, warp and weft, very much after the style of ordinary linen, but infinitely more durable. The word 'khaki' is derived from the Hindu, and means simply dust or clay colored; but in the war office sense 'khaki' is elevated from the position of adjective to substantive, and refers exclusively to that drab-colored material which was worn for the first time, probably, by some of the East Indian regiments. Throughout the Egyptian campaigns it was used by our troops, and when the Guards arrived in London after the last expedition they were clad in the very garments which will shortly be served out to them again for service in South Africa. As they detrained at Waterloo last autumn and marched through the cheering multitude to Wellington barracks, it must be admitted that the mud-colored tunics and breeches failed to appeal to the eyes of people who had associated the brave fellows with that 'thin red line' of glorious memory, but the outfit certainly possesses many advantages from the point of view of practical work.

"Lancashire, of course, is the home of the industry, and, in order to meet the requirements of the government, the factories there have lately been working very hard. There is a vast quantity at the present time at the headquarters of the army clothing establishment in Pimlico, and the statement that the departure of the troops has been delayed owing to the difficulty in obtaining the material is absurd. Some 15,000 men and women have been employed recently in manufacturing the clothes, which are packed and transported by fatigue parties of soldiers to the various destinations. As regards clothes, the wisdom of decentralizing stores has been abundantly proved during the progress of the present scheme of mobilization. Instead of the delay and confusion which used to ensue when the uniforms were dispatched from the London centre to a number of points far and near, we now have a well organized system under which the goods are sent to the various provincial centres, there to be redistributed. And thus we are assured that by the time the last reservist presents himself, within the limit fixed by the Queen's proclamation, a suit of khaki will be awaiting him, in addition to the rifle and other accoutrements which are, meantime, stocked in the Tower. The soldiers themselves are anxious to exchange their present uniforms for the campaign outfit, owing to the increased comfort they will enjoy. Though strong and unshrinkable, the material is much more flexible than the customary cloth, and enables the man to use his weapons to greater advantage. Any soldier will tell you that the manual and firing exercises can be performed with much greater ease when khaki has been substituted for the tight-fitting and padded regulation tunic. In South Africa, as in the Soudan, there will be times when all officers and men must sleep in their clothes, boots and accoutrements, and in these conditions a khaki suit is as superior to the average uniform as pajamas to the frock coat and tweed trousers of the civilian.

"Some army experts are strongly in favor of a more extensive use of khaki for the purpose of campaigning, and especially of a variety called 'millerain drill.' Officers stationed in India have borne testimony to the rain-repelling properties of this fabric, which make it particularly adapted for use as an overcoat. The same 'drill' is also suited for the construction of army tents, because the material does not absorb moisture, beside which, after rain, the tents are not so heavy to

move about—a very important matter to troops when campaigning. A thermometer placed in millerain tents has proved that the temperature is lower by 10 to 15 degrees inside, as compared with other tents. The cloth being porous, the heated atmosphere is able to escape, while the material turns the heaviest downpour of rain. At the present time there are several regiments in India, cavalry and infantry, clothed in millerain khaki, as well as batteries of artillery. The suits which will be worn by our soldiers are not waterproof, but they are well adapted for hard work. 'I have worn various uniforms during the last 10 years,' said a guardsman to our representative yesterday, 'but give me khaki for a hot climate and rough campaigning. People talk about the superiority of serge, but they forget that bush and bramble will tear wool, but doesn't hurt khaki. At the same time, we should like a waterproof overcoat, as the rainy season is coming along in South Africa, and the moment you get cold you may become a victim of malaria or dysentery, or both.'

"In recent years khaki color has become fashionable with ladies, and khaki gloves are largely sold throughout England. This variety, however, is apt to fade, whereas the color for the troops must be tested by an army analyst and stand 36 hours' hard boiling! Cyclists and tourists have also taken to the material of late, a special quality of the fabric being manufactured for their use. Perhaps the chief difficulty about khaki is the confusion which exists as to the spelling of the word, 'kharki' being favored by some authorities, and 'kharkee' by others. The only objection from the soldier's point of view is that the wearer is liable to be called names. We have all heard of such regimental nicknames as 'Strawboots,' 'Cherubims,' 'Nanny Goats,' 'Slashers,' 'Sankey's Horse,' 'Die Hards,' and the 'Dirty Half-Hundred,' but few people in England know that the first Indian regiment to don khaki became known as the 'Dustmen.' Such a calamity has, however, so far escaped the lot of the brave fellows who have done yeoman service for us in Egypt and some of whom will shortly embark for new fields of victory in South Africa."

The National Export Exposition.

The National Export Exposition is now more than half over, and has been pronounced a success. The attendance so far has exceeded the management's most sanguine expectations, while the exhibitors feel that many good orders will come from all parts of the country through the attractive display of their products.

Among the most prominent exhibits in the textile machine and supply line to be found in Machinery Hall, are the following: H. W. Butterworth Sons & Co., Philadelphia; Link Belt Machinery Co., Chicago and Philadelphia; New England Butt Co., Providence; American Tool & Machine Co., Boston; W. S. Haines Co., Philadelphia; American Moistening Co., Boston; Dixon Crucible Co., Jersey City, and The Textile Machinery Co., Reading, Pa.

Among the prominent knitting machine firms represented we find: Scott & Williams, Philadelphia; E. Jenckes, Pawtucket, R. I.; Mayo Knitting Machine & Needle Co., Franklin, N. H.; Paxton & O'Neill, Philadelphia; Branson Machine Co., Philadelphia; James Taylor, Philadelphia, and the Beatty Machine Works, Cohoes, N. Y.

All the above firms have their several different machines running, and attended to by representatives who show every courtesy to all visitors.

A number of prominent mills have also looms running, and are turning out their different products, to the great delight of the crowds who pass through the building.

Another exhibit which has attracted wide attention is the Indo-Egyptian Compress Co. They have a large compress running, baling cotton into bales known as the Lowry bale, the merits of which can be seen at a glance.

The Exposition closes Nov. 30, but it will long be remembered as an interesting exhibition of American manufacturers' products.

Dormant Periods with Silk Worms.

The worms from their birth pass through five ages, and sleep (become drowsy and change) four times: First age, from birth to first sleep; second age, from first sleep to second; third age, from second sleep to third; fourth age, from third sleep to fourth; fifth age, from fourth sleep to the ascent to the wood.

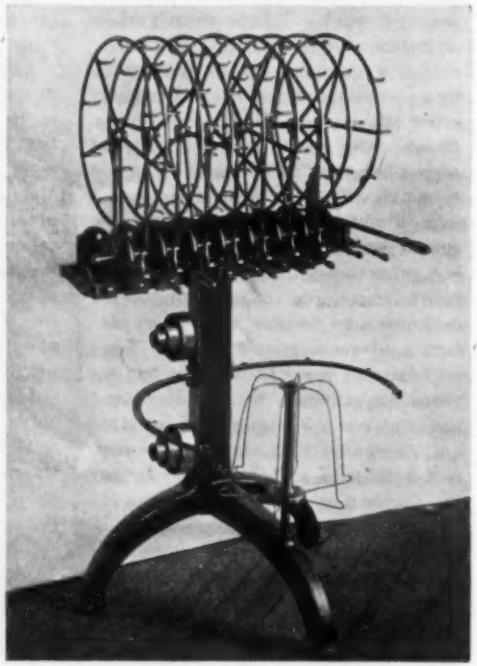
At the approach of the dormant periods much less food is required, and when these periods are actually reached the sleeping worms are not disturbed. From the fact that the worms of the same period, no matter how much care has been taken, do not always sleep for the same length of time, it is necessary to remove the ones still feeding to another place, so that the waste food may not smother the sleeping worms. When left to their natural instincts these worms always select dry, airy places for their nap. After these changes they must not be disturbed for a little while as they have just passed through an important crisis and their organism is extremely delicate. They have not only shed their skin, but the lining membrane of their intestines and trachea, and before moving them it is necessary to give them a light meal to refresh them.

—No stream in New England is more intimately associated with the early history of the wool manufacture than the Cochicawick river, which empties into the Merrimac at North Andover; and no section teems with memories of early ventures in this industry as does that northeast corner of Massachusetts included in Essex county.

Avoid Making Waste in the Knitting Mill.

A very interesting machine when viewed from an economical standpoint and a machine that will supply a long felt want among knitting mills, is the one illustrated in this article.

It is designed for raveling and back-winding, and will with equal facility handle any number of threads up to and including eight. It is very simple in its construction, easily operated,



and after a little experience an ordinary girl will be able to back-wind into skeins ready for re-knitting practically all of the waste that manufacturers are now either selling for a small fraction of its value or destroying.

The field for a machine of this class is very great since it can be used in any knitting mill whatever may be the class of goods manufactured. Pieces of underwear fabric made on machines having eight feeds or fewer may be back-wound, each thread be-

ing put on a different reel. Thus various colors and materials may be separated. It is especially useful where cotton and silk, or cotton and worsted yarns are used in the same fabric. Used in a mill where only the cheapest yarn is employed it is claimed that it will pay for itself in a short time, and where the higher grades of yarn in cotton, or where worsted or silk is used the economical value of the machine may easily be computed by any manufacturer by counting the difference between the price he pays for yarn and the price for which he sells his waste.

Even tuck stitch work, which heretofore it has been impossible to backwind so far as practical purposes were concerned, we understand is handled easily by this machine and is raveled as readily as the plain stitch fabric.

The machine is thoroughly well built, has no complicated parts to wear out or get out of adjustment, and requires but little power to operate it.

It is fully protected by patents taken out in the United States and Canada, and the principal countries of Europe. The sole right for the building and selling of the machine in the United States and Canada, has been secured by James Taylor, 835 Arch St., Philadelphia, and all correspondence relating to it will receive prompt attention at his hands.

Domestic Egyptian Cotton.

The United States Department of Agriculture has taken a deep interest in the growth of cotton from Egyptian seed, planted in American soil. Seed that has been obtained by the department direct from Egypt has been distributed to planters throughout the South, especially to W. H. Wentworth, Texas, for the purpose of experimenting with it to see what results can be obtained from it, in securing long stapled cotton that will answer the wants of manufacturers, the same as the genuine Egyptian cotton grown in its native soil. Frederick V. Coville, botanist of the department, writes us as follows:

"This department will, I am confident, devote a great deal of attention to the subject of improvement of our American cottons, as soon as it appears that an impression can be made upon the market. The especial point in which we are interested in connection with this matter, is the securing of a spinning test of Mr. Wentworth's cotton. We learn from him that negotiations are in progress with some manufacturers for such a test. I hope every endeavor will be used to get such a test made, as it will, of course, be useless to grow this Egyptian cotton if American manufacturers will not handle it."

In this connection we will say that Mr. Wentworth has sent on to the Boston market five bales of his cotton, for such a test, and it is hoped some manufacturer will become sufficiently interested in it to make a suitable test of its spinning qualities.

—State Labor Commissioner Lacy of North Carolina, has just made a report on labor in cotton factories, which shows that while in 1896 there were employed 6822 men, 10,567 women and 6046 children, there are now employed 13,950 men, an increase of 100 per cent., 15,887 women, an increase of 50 per cent., and only 3440 children, a decrease of 50 per cent. The number of spindles is now 1,200,000, an increase of 33⅓ per cent. since 1896.

—In our October issue, page 40, we had an article relating to the first woolen mill ever erected and started with modern machinery in China. It will interest many of our readers to know that this machinery is largely the manufacture of M. A. Furbush & Son Machine Company, Philadelphia, Penn.

—When the United States has been at war the woolen manufacture has been called upon to clothe her soldiers, and for this reason the periods of war have always been those of its greatest prosperity.

COTTON DEPARTMENT.

Principles of Cotton Spinning.

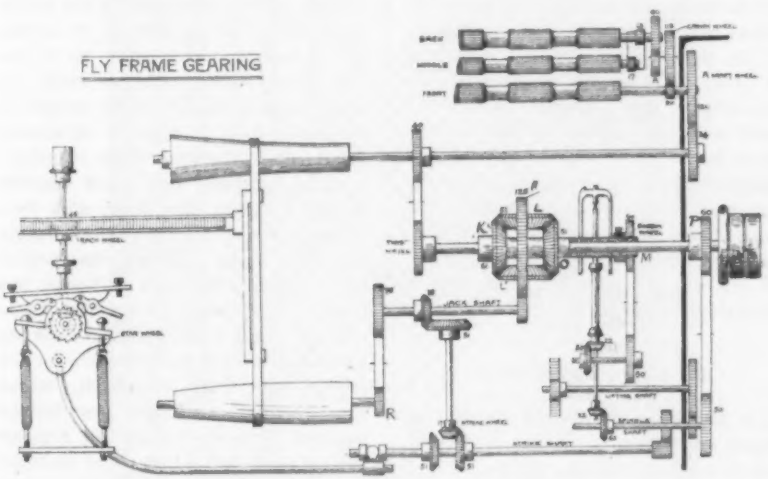
ROBERT CUNLEFFE.

In our October article we referred to the difficulty in winding on the roving in the slubber, intermediate and jack frames, consequent upon the increasing diameter of the bobbin on which the roving is being wound. The idea of automatically accelerating or retarding the speed of the bobbin in relation to the spindle, appears to have been first broached by a Macclesfield man, named Green, who patented, in 1823, a plan for that purpose; though practicable, it was so complex, cumbrous, and destructive that it never got much beyond the experimental stage. The central idea, however, was taken up by Mr. Holdsworth of Manchester, and after a couple of years' study, he overcame all the difficulties that stood in the way, by the invention of the differential system, one of the most beautiful examples of automatic equation that has ever been devised. Beyond the addition of a balance wheel, this arrangement, until recently, has not been improved upon since it left the hands of the inventor over 60 years ago. This proves the great merit of the invention, and the high degree of skill with which it was wrought out.

A brief description of Holdsworth's invention may now be permitted, for which purpose we introduce an illustration showing it as now generally in use in English mills. In our last, we referred to the fact that in the slubber, intermediate and jack frames, there are three main factors to deal with, namely, drawing rollers, the spindle, and the bobbin. The first two revolve at a constant speed, the latter, at a constantly varying one. With a bobbin lead arrangement it commences at the maximum rate, which is slightly diminished every time a layer of rove is deposited upon it, until the bobbin is filled, when its rate of revolution is very nearly reduced to that of the spindle. As the delivery of rove from the front roller is at an unvarying rate, it is required that the winding surface of the bobbin shall take it up in the same manner. This surface being a constantly enlarging one, it becomes necessary, in order not to stretch the rove, that its ratio of revolution shall be retarded in exact ratio to its increased surface. Hence the requirement of the differential arrangement for driving. This is the problem Mr. Holdsworth had to solve, which he accomplished by the method shown in the illustration, which we proceed to describe.

It must be borne in mind, that the power to drive all the parts of the machine is derived from the main shaft of the frame, which has a uniform and constant revolution. A proper train of wheels drives the drawing rollers at a uniform speed; another train drives the spindles, also uniformly from the wheel P upon the main shaft M. These are what we may term the constants. We have now to get the variants, the bobbin and the mechanism which drives it. Power is taken from the main shaft M through the wheel O to the top cone drum, one of a pair, by the rise of which the variant capabilities are brought in. From the top cone drum, power is transmitted by means of a strap to the bottom cone, upon the axle, or shaft, of which is fixed a small pinion wheel R, gearing into the sun wheel N. Upon the wheel N two lugs are cast to form bearings for the wheels L L′, through the first of which the power is transmitted to the bobbin wheel, while L′ is an idle, or at most a balance wheel. The bevel wheel K, which is fastened on the shaft M, is the main driver of the arrangement. Being fixed to the shaft and revolving with it, it turns the

wheel L, this again causing the bevel to which the bobbin wheel is cast to revolve, opposite to the revolution of the main shaft. The wheel N and those connected with it are necessarily loose upon the shaft M to admit of their revolution and variable movement in the opposite direction. If the bottom cone pinion R was not moving, the rate of revolution transmitted from the bevel K through the wheel L to the bevel attached to the wheel O would be exactly equal to that of the shaft M upon which it is fixed. Thus the wheel O driving the bobbins would revolve at the same rate as the wheel P driving the spindles, the revolution of the two wheels would be in opposite directions; and spindles and bobbins, as a consequence, would revolve exactly at the same rate, in which state no winding could take place. But if the sun wheel N were made to revolve upon the shaft at half the speed of the wheel K, but in the contrary direction, the wheel O, which drives the bobbin, would run at double the speed of the wheel K.



If, therefore, the sun wheel N be driven at an intermediate speed, and the speed be also made to vary in proportion to the increasing diameter of the bobbin, the wheel O will impart to the bobbin a differential motion, which also will vary in the ratio of the diameter of the bobbin. This object is obtained by driving the sun wheel N through the pair of regulating cones, whose centre lines are parallel, but reversed end to end in respect to each other. The first, or top one, is concave, and is driven at a constant speed direct from the main shaft, and drives the lower cone, which is convex, by a strap, which is made to travel gradually from one end to the other. Hence, the sun wheel N which is driven by the bottom cone through the jack wheel R, runs at a varying speed, depending upon the position of the strap upon the cones. By making the strap travel along the cones at a rate corresponding with the increasing diameter of the bobbin, the speed of revolution of the bobbin is accurately proportioned to its diameter, so as to give the required uniformity in surface speed throughout the winding.

The travel of the strap is effected by a rack motion with a star wheel to regulate it. Each vertical travel of the bobbin lifter releases the star wheel half a tooth, and allows the corresponding distance along the cones by the weight acting upon the strap fork. The power to diminish or accelerate the rate of revolution is derived from the cones.

As the wheel N, driven by the cone

pinion R, revolves the speed of the wheel L and its connection, the wheel O, are accelerated in exact ratio, and thus the excess speed of the bobbin over the spindle is obtained.

At the commencement of a set, the bobbin must run at its maximum rate, and the machine therefore begins its work with the cone strap upon the largest diameter of the driving cone, and upon the smallest diameter of the driven cone. With the deposit of every layer of rove upon the bobbin, the strap is traversed a little distance from the largest diameter of the top cone, and each successive change, until, with the full bobbin, the minimum diameter is reached, giving the minimum rate of revolution to the bobbin.

We think this description will give a clear idea to our readers of the working of this beautiful mechanism, and although it has served its purpose for 60 years without any marked improvements being made, yet practical men have seen some defects, but have been, until just now, unable to remedy them. It will be our purpose in our next to point out these defects and their remedy.

Leno Jacquard Designs.

It has been previously stated that there are two kinds of leno jacquards, or, to be more correct, two methods of fitting up the harness, the American and the English, and, therefore, a different system of designing is required for each of them.

In our last article (August) the system of designing for a jacquard, tied up on the American principle, was explained. In the present article it is desired to explain the method of designing for jacquards tied up on the English principle, consequently Fig. 1 has been made which, if compared with the one previously given, will be found exactly the same as regards the formation of the leaf. It is in the designing for the gauze where the difference is, as will readily be seen.

In making these designs another question arises as to whether all the doup standards shall be raised together or whether they shall be raised alternately as shown in Fig. 1. The latter method is undoubtedly the best, as by doing so the weight of raising the harness is about as equally divided as possible, which of itself is an advantage, for if all the doup standards were raised together so much weight would require to be raised that the loom would run with an uneven, jerky motion, especially when changing over from a doup standard pick, to a pick in the open shed, and vice versa. So the aim of the designer should be to make his designs so that the loom and jacquard will run with an easy, light movement as far as he can possibly do so; that is, if he can do it without interfering with the quality and exactness of his work. In these designs, so far as the ground is concerned, this is possible of accomplishment if the ground be of gauze.

Again referring to a back number (April) a sketch was given of a leno jacquard for which the present design has been made. It will be noticed that there are ten rows of hooks, but that on the design paper used there are only eight small checks. Now we know that two of the rows are for the easers and doup standards, which consequently leaves eight rows for the figuring harness, so that 8 by 8 paper can be used, yet if this count of paper is used something more than the ordinary marking of the pattern is necessary.

One method is to make the pattern first on 8 by 8 paper and then transfer it onto 10 by 8 paper, and placing in the 9 and 10 rows the marks for raising the easer and doup standard harness. This is of course an expensive method and trouble, and is not necessary if an experienced card cutter is to cut the cards, for by placing the marks in between those that raise the harness to form the open shed, as shown in the figure, and cutting them respectively on the 9 and 10 rows, the effect will be the same. These marks will, of course, require to be of a different color from the others, so that

there will be no liability of the card cutter making a mistake.

Let us examine the design. To one inexperienced on leno jacquards, the designs of such always seem to be something short, or, as it is often thought, they are wrong, which at first will seem to be the case, until an explanation is given. It will be noticed that on four out of the eight checks there are no marks whatever, and this is frequently the cause of the assumption that they are wrong. The fact is, these threads are always down, they are never raised, when gauze is being made, for it is only the threads that pass through the doups that work. These threads are first on one side and then on the other, according to the number of picks required between. Now, knowing that two threads out of every four are standard and pass through the first two of the figuring harness and over the doup, and that the other two threads pass through the third and fourth of the figuring harness and through the doups, it will be obvious that extreme care will be required in designing such, and also in the explanation and directions to the card cutter.

Take the design, for instance. If the cards were cut as it is with the marks for the open shed on the first and second checks, they would be cut wrong, from the fact that these two threads, as already stated, pass over the doup, whereas the marks are intended for those threads that pass through the doups; so that in this case the design would have to be upended, or in other words the top of the design would be placed at the bottom. The solid black represent the marks

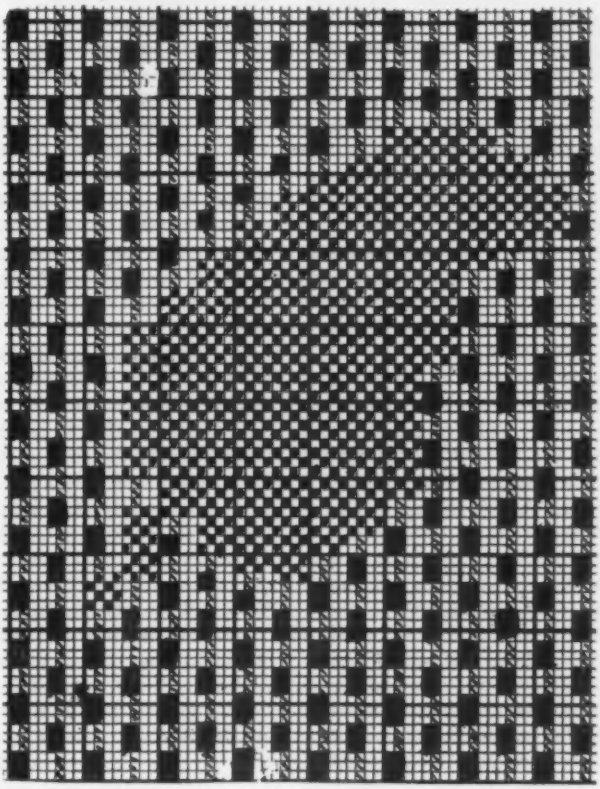


FIG. 1.

for the open shed and the single marks for the doup standards and easers. So it will be seen, at once, that while one set of four ends is making a doup standard pick, the other set of four ends is making an open shed pick.

The design being upended, the card will require to be cut as follows: The first single marks to be on the ninth row and the second single marks on the tenth row.

For the first stroke for design, miss six, cut three, miss one, and repeated all the way across. This will no doubt be clear, as, although the single marks are on the third check, they are intended to be cut on the ninth check, as before stated. This will be repeated three times.

The card for the fourth pick would be, miss two, cut two, miss five, cut one; this being the single mark on the tenth row, and is repeated all the way across, and three times.

In cutting the cards for the figured portion of the design this would be done, as for an ordinary brocade jacquard that has eight hooks and needles in a row, for the ninth and tenth hooks would be left down.

The doups will, of course, be required to raise every pick, but this is provided for, as the hooks that work the doups are generally tied to the griffe, or knife, so as to be sure of their being raised. Worsted makes the best doups for weaving, especially for strong work. These doups are knit on a shaft with a certain number to the inch according to the number that is required for the pattern and the width the cloth is required to be. For instance, if the pattern repeats on 400 ends, drawn in two and two, then one doup will be required for four threads, and 100 for the full repeat; or, if the pattern is woven in a 20/4 reed, that would equal 80 threads to the inch, and one pattern would occupy five inches in the reed, which, if 30 inches wide, would give six repeats of the pattern; and, as already seen, one pattern would require 100 doups, then the whole would require six times more, or 600. This number divided by 30 inches wide, will give twenty doups on one inch.

An important point in the successful running of a leno jacquard, is not to have a larger shed than is absolutely necessary, for, by making a large shed, a greater strain is put on the warp and also upon the doups causing them to wear out much sooner than they otherwise would. A shed, just sufficiently large enough to allow the shuttle to pass through, is sufficient, taking care that there are no ends hanging loose. Of course, the shed can be made too small, which will have a tendency to throw out the shuttle as well as tear out the yarn by the continued friction of the shuttle passing to and fro. The threads hanging loose when making the shed is one of the principal things that has to be looked after. These threads hang loose often at the sides on account of the harness being out of the vertical, as occasionally a harness twine will be tied too low. Another cause is that the picking motion is set to pick too early, causing the shuttle to enter the shed before it is fully open to receive it, and especially if a small shed is being made. In these jacquards, the filling is beaten up and in a close shed so that the reason of ends hanging at sides will be seen at once. The picking motion is generally set to pick a little late, and, of course, will require a little more power behind it so as to clear the shed before it closes again for the beat up.

THOMAS.

Answers to Questions Set by the City and Guilds of London Institute.

Question: Describe the feed mechanism of a Heilman Combing Machine, and say how much cotton should be delivered by each movement of the feed roller.

Answer: In the Heilman Comber there are three kinds of movements: the intermittent, the forward and backward motion, and a continuous motion. The feed part of a comber is

of the first kind, viz., intermittent, that is, it moves a short distance, then stops for a certain period in order that the length just fed in may be operated on by a stud or finger fixed on the driving side of the machine, while on the end of the feed roller is fixed a wheel with notches or spaces. At each revolution of the machine, this finger or stud drops into the notch, and moves it a certain distance, causing the feed rollers to unwind a certain length of the lap. This is the case with a single Heilman Comber. In the double comber, there are two studs or fingers, so that, for every revolution, there are two movements, causing the feed rollers to deliver two lengths of cotton each revolution. The length of cotton fed in by each movement, varies according to the length of staple being worked. The rule is, for the length fed in by each movement of the feed roller to be about equal to the length of fibre operated on.

Question: How many speed frames would you use, if you were producing rovings for (a) 16's yarn from Indian cotton; (b) 36's twist from Orleans; (c) 60's from carded Egyptian cotton; (d) from combed Egyptian? In which cases would double rovings be used? State briefly why.

Answer: Perhaps some of our readers may not understand the term as put in the question "speed frame." In some districts they are called fly frames, spoken of as slubber, intermediate and jack frames. The rule is to use the three frames just referred to; when anything different is done it is the exception. But if we were producing rovings from Indian cotton for 16's yarn, two speed or fly frames would be sufficient—slubber and jack frames—for two reasons, first, because the length of fibre of Indian cotton is short, and thick or coarse. For these reasons this cotton will not stand the same amount of drawing and twisting as finer and longer fibres will; and second, because the hank roving, being made at the Jack frame ready for the mule or throstle, will necessarily be coarse, say about three hank. This can be got without any excessive draft on either of the two frames, therefore there is no necessity for useing more. For 36's twist from Orleans, we should use three fly or speed frames—the slubbing, intermediate and jack frames. We are quite aware that many, for economical reasons, use only two; but we think the majority, in order to obtain a better class yarn, will use three. Orleans cotton is much finer in staple than any Indian cotton, and will stand drawing more. Again, the counts to be spun at the mule or throstle are more than double that in the previous case, so that the hank at the jack frame must be more than double also, unless we have a larger drop at the mule. For 60's, from carded Egyptian cotton, the same number of fly or speed frames, viz., slubber, intermediate and jack, and for 120's combed Egyptian, four fly or speed frames would be best—slubber, intermediate, roving and jack frames. To spin 120's at the mule, it would require from 18 to 20 hank roving to be made at the jack frame, unless we have a very excessive draft at the mule. For instance, if 20-hank roving was made at the jack frame, two of these would be doubled together at the mule, which would require 12 of a draft to produce 120's—$120 \div (20 \div 2) = 12$ draft. So, to get this fine hank, we must use four fly or speed frames, so as to avoid excessive draft in the rollers of any of these frames. Double roving should be used only on one frame, the jack, for 16's Indian cotton. For 36's Orleans, two frames—intermediate and jack. And for 60's and 120's double rovings should be used, on the intermediate, jack and mule. The reason for this is that when double rovings are used, either the roving must be made finer, or the draft must be much greater. For the finer counts it is better that this should be done. Besides, by doubling, we get a more regular and uniform yarn, which is very desirable for fine counts.

Question: Describe any motion with which you are acquainted for actuating the long rack in a roving frame, by which the position of the

cone belt is altered. Does the release of this motion affect any other part or parts than the cone belt? If so, which, and how?

Answer: At the commencement of a set of bobbins in the roving frame, all the different parts are moved to the end to be ready for a fresh start. The cone strap is moved to the end of the cone drums, the long rack to the end of the traverse, or slot, etc. Every layer of roving wound upon the bobbin increases the diameter, and makes it necessary for the bobbin to run slower and, consequently, the long rack, which carries the cone strap fork, is moved a certain distance each time the traverse reaches the top or bottom of the bobbin. This is accomplished in the following manner: There is at the back of the frame, what is called the building motion, a box of tricks, and connected with this are two cradles—the upper and lower. The upper cradle has attached to it, at each side, double hooks, which pass through holes in the lower cradle, and have weights attached to them. In the lower cradle a pin is fixed, which engages with a slat in the lever centred on the pin, and jointed to the rod coupled to the strike wheel. On the pin a rack wheel is fixed with which two catches can alternately engage. These catches are coupled by a spring, and are of different shapes so as to engage with the teeth of the rack wheel at each side of its centre. As the bobbin rail descends the upper cradle is oscillated on its axis, and, in consequence, one hook is raised while the other is lowered. There is a shoulder or boss on the latter, which prevents its falling too low. As the upper cradle continues to oscillate, the screw begins to press on the outer end of the catch. As the two catches are coupled by a spring, the movement of one is accompanied by a similar movement of the other. Thus the rack wheel can only move half a tooth for each of the oscillations of the cradle, in either direction. On the shaft is fixed a drum, around which a cord is wound, and has a weight attached to its extremity. This weight is constantly pulling at the wheel to move the rack, so, when the catch is disengaged, the rack is moved a corresponding distance, carrying the cone strap with it. The next part of the question: Does the release of this motion affect any other part or parts than the cone belt? We answer, yes. Two other parts are affected, first, the reversal of the lift or traverse. Each time the carriage reaches the top or bottom of the bobbin, the wheels driving the racks which work the carriage, need to be reversed. For this purpose there are two bevel wheels, worked by another bevel wheel in the centre, only one of the two being driven at the same time. Just at the moment when either of the two catches, referred to above, is pressed away from the star wheel, and the long rack is moved along with the cone strap fork, these two bevel wheels are moved, one out of, the other in, gear; by which action, the shaft working the racks connected with the carriage is reversed, thus lifting or lowering the carriage as it gets to the top or bottom of the bobbin. The second part affected is the shortening of the lift or traverse. When the bobbins had large heads or flanges, on the top and bottom, the lift was all one length from the start to the finish, but now that tubes only are used, it is necessary to make a cone-shaped top and bottom for this purpose, the traverse must be shortened. To accomplish this there is another rack and poker bar. At the commencement of a set on the empty bobbin, this bar is at the full length, so as to give the longest lift. But at each upward and downward lift, as the rack carrying the cone strap is moved, this rack moves also, shortening the bar, which gives the cone shape to the bobbin. Thus there are three different parts affected at the same time by the release of this motion. First, the movement of the cone strap on to a smaller diameter of the driving cone and larger diameter of the driven, in order to slower the bobbins. Second, the reversal of the carriage, lifting or lowering as the case may be. Third, shortening the lift, so as to give the cone shape to the bobbins.

The Dederick Bale.

Paper read by W. H. Perkins, Boston, Mass., at the Montreal meeting of the New England Cotton Manufacturers' Association.

Much has been written and a good deal has been said during the past few years about improved methods for baling cotton. That improvements were necessary, no one will question.

The slow screw press abandoned for baling hay almost three quarters of a century ago, is still used for baling cotton into absurdly grotesque and ill looking bundles. Some improvements have been made, and the round bales being the first to be brought prominently before the people, have found more or less favor; but there was still room for improvement, as length of staple in cotton is value, and every single fibre has scarcely perceptible strength; hence, any process of baling that puts strain on the fibre, like pressing it by movement against rollers or slides must break innumerable fibres, and proportionately damage and depreciate the value of the cotton, although this may be imperceptible to any but an expert, moreover, any foreign substance that may be in the cotton is thus crushed and ground into the cotton so that it must be difficult to separate. It follows that to fully preserve the fibre, and to pack without damage, the cotton must be confined in a box or case when subjected to pressure, and the pressure must be a force, and traverser face with immovable contact on the surface of the cotton being pressed, and the bale must be formed the first operation, without further reducing under a compress.

I exhibit here a bale, quadrilateral in shape, put up under these conditions, unexceptional in all respects, and the neatest bale ever produced, being smoothly and evenly covered and bound, and of just the right size and form to handle and store well without waste room, the press doing all the work, even to covering and binding the bales. The covering, if made of heavy cloth, will hold without the bands. The bales may be repressed if desired with better results than any other bales. We have here four bales of different sizes, density and weights. A bale weighing 100 pounds, one weighing 200 pounds, one weighing 250 pounds covered with light burlap and banded, another bale weighing 100 pounds and covered with a light casing of steel for full protection against fire or water. We can cover any size bale in this way up to 500 pounds. You will note that the bale weighing 200 pounds and the bale weighing 250 pounds are of like dimensions, the difference in density making the difference in weight. We can furnish you bales of any density, and maintain it, or any desired weight from 100 pounds to 500 pounds. The burlap and bands on the 200 and 250 pound bales weigh three pounds.

In pressing the bale we cause a ridge to be formed, from the top to the bottom of the bale, from which samples can be drawn, showing the grade of every layer or lap in the bale. If desired, a sample can be drawn from between the bands the same as from the old style of flat bale. By standing the bale on end, and cutting the bands, the cotton will open out in laps which can be readily thrown into a pile or on the picker direct if desired, leaving the burlap in one whole piece for further use, as it is confined only by the bands and the ends tied or sewed together. These laps are pressed into the bale separately, not squeezed down all at once, as in the old compress, hence, they open out without any labor being necessary. The cotton is pressed so as to cause the least possible injury to the staple, the process being to push the cotton into a steel chamber, against a solid head, and as it is ejected from the chamber, the burlap and bands automatically cover and bind the bales. These bales measure 18″ x 24″ x 24″ in the chamber, and 18″ x 24″ x 28″ out of it, or seven

cubic feet. It is plain that this bale will take much less space than any round bale of the same weight, and we can produce them as rapidly as any battery of gins can deliver the cotton. We can easily produce a bale weighing 200 pounds, all covered and hooped, every two minutes, and by a simple method of weighing the cotton before baling, we can give you any number of the same weight, so that there could be no raising of the weight in invoices by the stroke of a pen, as is often done with cotton shipments of irregular weights; and another advantage which I am sure your clerks will appreciate is this, that invoices can be made for the total weight, the detail being unnecessary, you would know at once, when looking at your invoice if you had bought 100, 200 or 250 pound bales, whether the rates had been raised, or a clerical error had been made; and in making claims for loss in weight the same making of detailed weights would be done away with; and again instead of weighing each bale when it arrives at the mill, you can weigh it in the car, saving time, labor and expense all around.

To sum up, our claims are substantially as follows:

A bale which will command the lowest freight rates; a bale which is easy to handle, and in this respect our 100 to 125 pound bale should meet the wants of small consumers, especially; a bale which has the least possible injury done to the staple; a bale which will stand fire or water, as well as any bale, and if you want an absolute fire and water proof bale, we can supply you, and it is just as easy for us to push the cotton into a steel casing, as into a burlap; a bale which opens up in layers without physical effort, with the staple laid smoothly, all in the same direction. There is no twisting or grinding of the staple in this bale; a bale which can be sampled and examined, as no round bale can be, the sampling ridge from top to bottom being a perfect mode for detection, and consequently, for prevention of mix-packing; a bale which will store the largest amount of cotton in a less space than any other bale in the world; and lastly, a bale which has been praised by every Southern shipper who has seen it, and many of the largest ginners in the South are anxiously waiting for us to place our presses in their hands.

The Spinning Wheel.

The spinning wheel fad has a revival. The wheel is valued not only as an antique, but among society sets spinning contests attest that it is in actual use, and the grandmothers who can give lessons are in demand. An English revival is of a more practical quality. In the vicinity of Salisbury the ancient industry of wool spinning and weaving by hand has been revived in order to afford remunerative employment to women, and to produce a fine quality of cloth made from English wool by English women working in their own homes. The Princess of Wales gives her patronage to this industry. The art of spinning and weaving is taught by a London school. The cost of the spinning wheel and a hand loom is quite reasonable and many English homes have the outfit, in the use of which there is a fascination. In Belgium the pursuit is made quite profitable. In many American homes the spinning wheel and carding machine used by our grandmothers have cherished places, and it would need only a slight impulse to bring these pursuits into general practice once more. Queen Victoria preserves the old spinning wheel at which she worked in her younger days, and her example finds many imitators in smart sets in the United Kingdom.—Exchange.

—Most of the original woolen mills of New England started with men whose ambitions at the beginning did not reach very far beyond their own vicinage.

WOOLEN DEPARTMENT.

Ingenuity in Modern Textiles.

CHARLES E. WILES.

ARTICLE VIII.

(Copyright.)

Mantle Cloths: The production of textures for the cape and mantle trade forms another important branch of the textile industry. Whilst bearing some degree of similarity to the manufacture of dress stuffs in so far as concerns the wide diversity of style which is everywhere apparent in these goods, it will be found that there are certain restrictions imposed upon the designer of mantle fabrics which are seldom met with by the maker of ordinary fancy dress goods.

On the other hand, many interesting effects, due perhaps to some novelty in coloring, weave or material may be satisfactorily utilized for mantle wear, whereas the same idea applied to dress textures might result in the production of fabrics too clumsy for wear and too aggressive in color and design to be consistent with the ethics of good taste. And this state of affairs is one to be steadily avoided. The ultimate purpose which any particular fabric shall serve should furnish an item of paramount importance in the code of every designer; let him simplify, modify, beautify to the limit of his ability, but throughout the processes he must ever pay strict attention to that most important detail—fitness, if he desires to profit by any success of his production.

Natural inherent faculty, developed and strengthened by careful and systematic training; this is the combination of elements which alone evolves the true designer. Rules may be learnt, hints digested, and the imitation of copies steadily proceeded with to infinity, but all this, unless there be a definite natural aptitude, will do no more than formulate a groove along which the "rule-of-thumb" man may plod in the grim monotony of his confined intellect—looking neither to the right hand nor to the left, turning out what are probably little more than repetitions of something or other which was in all likelihood a repetition when he commenced upon it, living in the breach 'twixt success and failure to the end of his days.

Turning, however, to a technical consideration of our subject a few typical styles will be adduced showing, by means of accompanying remarks, relative to the methods of their construction, the large variety, whether it be in actual weave design or in material, which is met with in this particular branch of the trade.

Of the plainer makes of cloth little need be said. The main requirement here lies in a proper selection of materials, or a thorough knowledge regarding the economic though satisfactory blending of the same. Such, in certain quarters, is the state of wisdom on this point that nowadays even the lowest classes of goods are placed upon the market, and that with a brightness of color, and smartness of design and finish very little behind their better quality neighbors. Of course quality must hold its own in the long run; the cheaper article, even though it looked so very attractive on the counter, will possibly be in pieces before the other one has assumed any indication of age whatever. But this is not exactly the point; at any rate the manufacturer does not so assume it. If a cloth succeeds by its stylish appearance in promoting a good impression upon the minds of prospective purchasers, it has already traveled a fair way along the path to ultimate profit, for in multitudes of instances appearance is the only quality upon which judgment is exercised.

The plain weave, cassimere and other simple twills are usually em-

ployed in this connection, being sometimes worked in combination with different arrangements of colored warp and weft yarns which are applicable to them. The accompanying sets of weaving particulars will be found to give good results in so far as actual construction is concerned, but the choice of quality of material, which is so important an item in these cloths, is a matter beyond the phase of book instruction.

No. 1. A double checked-back mantling, yarns for face all nine skeins woolen, and for back thirty skeins. The two cloths are woven in the four shaft twill and stitched together by means of a series of cotton ends working between them, the arrangement of yarns in the warp being 1 thread of nine skeins for face, 1 thread of thirty skeins for back, 1 of 2/60s cotton for stitching, and 1 of 30 skeins for back.

Weft. One face, one back, alternately.

The color pattern for the face may be either in solid shade or in different colors of warp and weft, whilst curl and knop yarns are frequently employed; sometimes in the form of overcheckings and occasionally throughout the whole pattern. Thread arrangements for the checkings are in some cases imitative of the standard clan tartans or modifications of the same, effected by substituting other than the original colors, but preserving the order as regards quantity, whilst the third kind of checking represents no particular style, being merely designed in accordance with individual taste. This style of fabric has been and now is much in vogue for golf capes, etc., where a somewhat heavy type of cloth is required. The foregoing should be sleyed 18s reed 4s, with 72 ends and 54 picks per inch.

No. 2. Set of particulars are also for a full-weighted cloth which is, however, single in structure, woven from the ordinary six-end twill, three up, three down, and cut in twos, warp ways.

Yarns for warp, 5½s and 30s spiral twist.

Set, 8s reed, 2s.

Weft, all 9 skeins wool.

16 threads and 18 picks per inch.

A light green warp with filling of a darker shade, and scarlet warp shot with black weft are useful combinations for these fabrics. Some interesting effects may also be produced by employing two colors of yarn for the spiral. For instance, the finer of the two threads might be scarlet and the thick one black. This when woven gives a speckled appearance to the ground which is distinctly pleasing.

No. 3. A rather lighter cloth is made from a 2/12s worsted warp, set 9s reed 2s, with a 10 skeins woolen weft. 18 threads and 21 picks per inch. Weave—cassimere twill.

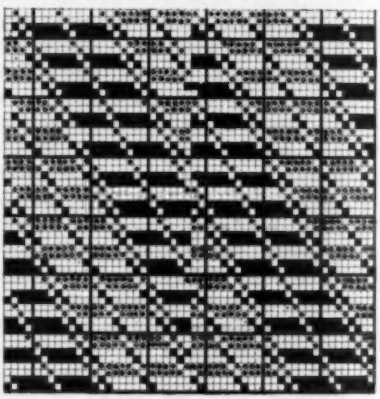


FIG. 1.

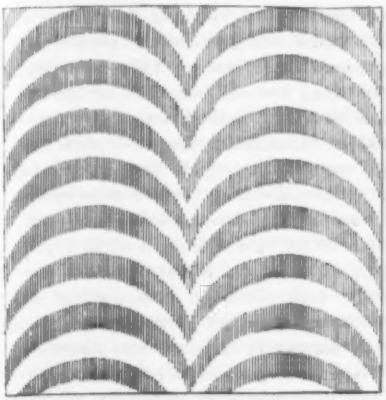
Coming to the fabrics which partake of a more elaborate construction, an instructive example is furnished in Fig. 1. Here the picks will be seen to be working in pairs, and by introducing two colors in the weft, a smart type of pattern is produced; for in those portions of the plan where one color is flushed on the face, the other color is at the back,—and vice versa. Various modifications of this may be easily produced by a little skilful manipulation in the rearrangement of the weave, and suitable instructions for weaving the same are appended:

Warp:
All 2/16s medium gray worsted.
24s reed 2s.

Weft:
2 picks of 12 skeins dark gray wool.
2 picks of 12 skeins light gray wool.
48 ends and 24 picks per inch.

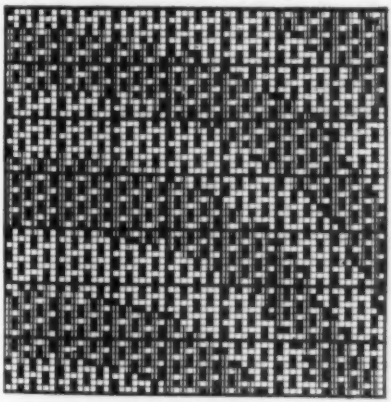
Sketch 2 illustrates another method

of construction which, as may be seen from the accompanying plan 2A, bears some resemblance to that shown in the first design. In the previous case, however, the figuring was due to



SKETCH 2.

the weft yarns whilst here it is entirely due to the warp, the other series of threads not being visible on the face of the fabric. A reference to the section sketched out will indicate that the actual construction is based upon the common two and one twill working thread and thread. The colorings



PLAN 2A.

for the warp are also arranged in the order, one dark one light, consequently all that it is necessary to do is to allow the dark warp to flush in those parts of the pattern which are required, dark and the light warp in the sections where the lighter figure is desired. At all other times the threads work on the two and one principle.

Designs similar to that shown in Fig. 2 are the most suitable for this class of fabric on account of there being no great length of float in either the dark or light divisions of the pattern. In finer makes the plain weave is often used in place of the twill to bind down the threads when they are not required for the figure.

Weaving particulars for Figure 2A.

Warp:
All 2/36s worsted.
Arranged 1 thread light lavender shade.
1 thread dark blue shade.
36s reed 2s.

Weft:
All 2/40s worsted—medium shade.
60 threads and 44 picks per inch.

The Science and Practice of the Construction of Woven Textures.

FRED BRADBURY.

(Continued from October.)

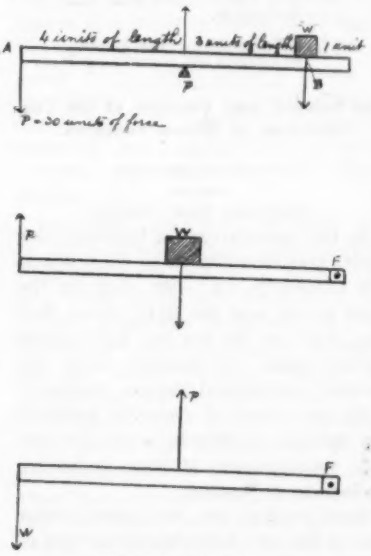
In the manufacture of the cloth now under consideration three warp beams are necessary, viz.:—one each for the dark brown and the light brown Botany, and one for the fine light brown cotton warp. In practice there are several mechanical means employed with the object of correctly controlling each set of threads to suit the specific requirements of their respective variations in tension.

Each method may be classed under one of the two following principles of "letting off": (1) Negative; (2) positive, or more correctly, semi positive.

The motions which come under the head of the former all consist of frictional appliances and are usually made up of a combination of levers, weights, ropes, chains or other simple means of gripping the warp beams at or near each end and contrived so as to resist the force exerted by the pull of the cloth and warp upon the beam of the latter.

The semi positive, or second, principle, is based upon the theory of positively unwinding the warp in proportion to the pull upon it, and is sometimes described as the "worm wheel,

let-off motion." In reality it is a combination of both negative and positive mechanisms, though occasionally it is inadvertently termed positive. Both motions are applicable to the manufacture of most kinds of woven textures, but the latter principle is better suited to the manufacture of heavy weight fabrics, and where two or more warp beams are employed, since very little or no adjustment is necessary between a full and almost empty warp beam. This is an important advantage, for in the former principle the weaver, overlooker, or as is sometimes the case, some person is



FIGS. 54, 55 AND 56.

specially set apart for the purpose, has to be continually altering the relative weights and lengths of levers. The second principle is consequently very much superior and better adapted to the manufacture of cloths of the type last described and in all cases where there are fabrics composed of two or more sets of warp yarns simultaneously requiring varying tensions. Further, since this is a subject which has given no small amount of anxiety to manufacturers of woven textures and also their foremen and overlookers, any discussion of the details and mechanical principles underlying the work to be done will be found to be, not only helpful in its most direct form, but will also tend to widen the roads of thought and make the artisan think more deeply, as is always the case whenever two or more principles or methods of clothing fundamental principles are put before persons of average intelligence. They then feel that they are not bound to accept the one idea and method, but are in a position to consider and compare the different ways of clothing the same principles ere they become subscribers to one or the other method of working. With this object in view I propose to describe, illustrate, fully consider and compare one method of clothing each of these principles. And since a consideration of these involves the application of various orders of mechanical principles of levers, a brief explanation of the essential principles will be useful at this juncture and will subsequently be found of assistance to a fuller understanding of what follows.

In mechanics there are three principles of levers each of which is governed by the relative positions and points of application of the power and the weight with respect to the position of the fulcrum. In each of the following examples P represents the centre of position of power or force applied. W represents the weight or resistance to be overcome. F represents the fulcrum.

The arrows at P, W and F respectively indicate the direction of the force applied, the resistance of the weight, and the reaction of the pressure on the fulcrum. In order to maintain equilibrium the force P must always be equal in magnitude to the resistance of W. These conditions of equilibrium in each system of levers will be understood by a careful study of the following. In the first system of levers, the fulcrum lies between the power and the weight as shown at Fig. 54. AB is a straight uniform lever of which the length of the arm AF is 4 units and that of FW is 3 units. Then if we assume that the resistance acting through the centre

of W is equal to 40 pounds, the force required to balance or keep the weight W in equilibrium would be less than 40 pounds because P has got a longer arm or lever. This force is always in the universe ratio of the length of the levers P and W, or P multiplied by the length of its arm is equal to W multiplied by the length of its arm. Then:

P4 = W3, = P4 = 40 × 3 = 120; P = 120 ÷ 4 = 30, or a force of 30 pounds applied at P will balance a resistance of 40 pounds at W.

In the second system of levers, the weight W lies between the fulcrum F and the power applied at P, as shown at Fig. 55. Here also PF = WF. In levers of the third order, the power P is applied at any point between the weight W and the fulcrum F as illustrated at Fig. 56, as in the first and second orders of levers PF = WF.

The students may supply their own examples for proof of the above equations. The foregoing principles will subsequently be applied in the solution of questions hereafter involved.

With this knowledge of levers we will now proceed to consider the negative or frictional methods which find a type in the illustrations Figs. 57 and 58. A represents the warp beam; B the back rest; C the top threads passing from the beam A to the back rest B; DD the gudgeons at each end of the warp beam, which are supported and free to revolve in a recessed portion in the loom ends and frame supports; E a lever fulcrumed and free to move about the point F which is also supported by the loom end framing; G a rope one end of which is made fast to the loom framing at H and afterwards is coiled once or twice around the beam end as shown and then made fast to the lever E at any suitable point as at letter I. An adjustable weight W suspended from the lever E completes the necessary mechanism. The opposite end of the warp beam being an exact duplicate of the one described requires therefore no comment except that when weighted and arranged same as the above it equalizes and doubles the tension upon the warp threads.

Fig. 57 is a sectional elevation as seen from the back of the loom.

Fig. 58 is a sectional elevation as seen from the side of the loom.

It cannot be claimed that this method satisfies all the requirements of an ideal warp letting-off motion, far from it, yet in the absence of a perfect apparatus it serves its purpose fairly well, being simple in its composition and very superior to some of the ways and means employed by our ancestors.

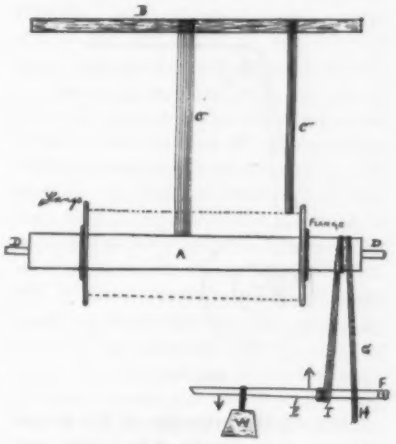


FIG. 57.

By this system of working, the cloth, as it is being taken up (no matter whether positively or otherwise) literally drags the warp from off its beam—the ropes, weights and levers simply acting as a resistance to the above force. The amount of resistance has therefore to be regulated so as to equilibrate the pull on the warp by the take-up of cloth, since the requirements of the latter for each warp beam are practically the same throughout the production of each "piece."

The difficulties of "letting off" would not be as great if the force of resistance could be kept as a constant factor. This is one of the greatest defects of the above mechanism, as will be easily understood from a con-

sideration of the following comparative calculations.

First, let the warp beam be full; second, let the warp beam contain only one lap of warp.

The radius of the almost empty warp beam is 3 inches. The radius of the full warp beam is 7 inches.

Let X = the pull of the warp at the first, and Y = the tension in the rope G.

The weight W equals 32 pounds, and is suspended at a point 27 inches from the fulcrum, the rope being adjusted 18 inches from the weight, and 9 inches from the fulcrum.

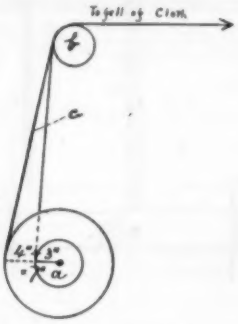


FIG. 5e.

Then by the principle of the second system of levers to which this specific example belongs, the weight W multiplied by the length of its lever is equal to the tension in the rope attached to the lever at I multiplied by its length of lever, otherwise the two forces acting in opposite directions could not be in equilibrium thus:

W27 = Y9 = 32 × 27 = Y9.

Therefore tension in rope Y = 32 × 27 ÷ 9 = 96 pounds at point I.

This tension in the rope will remain constant unless the weights are altered. It should also be noticed that the combined tensions in the ropes which are coiled around each end of the warp beam indicate the amount of resistance that is offered to the pull of the warp when the warp beam is full, assuming that these forces are correctly adjusted so as to be in equilibrium.

Then since the pull of the warp remains constant X ÷ 7 = 2 × Y at first.

X = 14 Y, i. e., the units of resistance which X is capable of overcoming when the warp beam is full; and X ÷ 3 = 2 × Y, and X = 6Y, the relative number of units which the pull of the warp is capable of overcoming when the warp beam contains the last lap.

Therefore (amount of resistance to overcome at first) ÷ (amount of resistance to overcome at last) = 14Y ÷ 6Y = 7 ÷ 3. Hence if the weight W is 27 from F at first, it only requires to be from F (27 × 3) ÷ 7 = 81 ÷ 7 = 11.6 inches at the finish.

Note:—The weight of the levers acting through their centre of gravity is ignored, since it is the same in both instances and this is simply a comparative calculation. Consequently there is always a reduced tension taking place upon the rope necessitating repeated adjustment of the weights and levers. It was with the object of obviating this defect that the worm wheel or semi-positive "let-off" motion was introduced, which, as previously stated, unwinds the warp from its own warp beam as required. Further, the amount of weight and leverage at the commencement is almost identical with the amount employed at the finish. This is especially true of the heavier makes of fabrics since the very slight variation in power of resistance which the warp has with a full beam and an almost empty one is comparatively insignificant and is therefore least perceptible in a heavy make of fabric.

Carpet Designing and Manufacture.

Paper read by M. F. J. Mayer before the Society of Designers, Kidderminster, England.

Many writers on the principles of design have given excellent pronouncements as to what a carpet should be and should not be, but in most cases they have entirely failed to note that a carpet is but an accessory to a scheme of decoration that is invariably prearranged or that pre-existed. It is

very easy to say that a fine old Persian carpet is perfect; so it often is viewed, per se, or in a Persian interior, or with balancing harmonies all around. But view the same carpet laid in a Louis XVI salon, and I ask if anyone with an unwarped sense of decorative fitness would not long for the pearly tints and easy grace of an Aubusson? The fact is, that the first thing a carpet designer has to consider is not the carpet itself, but its surroundings, and the part it will have to play in harmonizing and unifying the rest of the room. Seldom or never is the carpet the starting point or keynote of the decorative scheme of a room. Of course, if a carpet designer has a free hand to design a carpet unhampered by any other decoration, as in the case of a room paneled in deep toned woodwork, a room which would depend on the carpet for color and for the completion of its artistic effect, then may he embody in it to the utmost of his ability all the qualifications of a perfectly satisfactory carpet. But, unhappily, such rooms and such conditions are all too rare. We have to remember that in ninety-nine rooms out of a hundred, as I have said, the keynote of the decoration, as regards style, quality and color, is decided in the work of the decorator and furnisher, and the possibilities of the carpets must be dependent to a large extent on their work. In many modern English rooms, with wall papers in excessively light color schemes and patterns of very slightly conventionalized forms, a carpet with the qualities of the fine Oriental examples would seem to me incongruous, as would a Beethoven Sonata substituted for one of the numbers of the "Geisha." I take it, then, that the first requirement of a carpet, as far as we are concerned, is that it should harmonize with its surroundings. The consideration of this takes precedence of principles applicable to a carpet viewed by and for itself, on the broad principle observed in all branches of art, that details must be subservient to the "ensemble."

Coming now to the special requirements of a carpet and the general principles of design applicable to it, we find that it differs from all other in the fact that it is always seen obliquely or in perspective, and that it should be pleasing—I do not say look the same—viewed from any part of the room. Everything else has its right way up. The most elementary and obvious way of making a carpet seem correct, viewed in any direction, is, of course, to build the design on a radiating plan. This, however, seldom proves as satisfactory in practice as in theory. Designs on this principle have an unfortunate way of recalling one's early efforts at the school of art, for one thing; then in counteracting a "line" in one direction they generally succeed in creating lines in every direction, some of which cut the lines of walls and furniture at very unpleasant angles. The designs of William Morris and Mr. Voysey for carpets woven in breadths have often been criticised on account of their straight bisymmetrical build, but I must frankly say that when made up and laid they are generally perfectly successful, and, in spite of their not conforming to the teachings of Owen Jones and Dr. Dresser, they are really beautiful and suitable designs. So that I have come to the opinion that the success of a carpet design is but slightly dependent on its build. The adoption of the straight build by no means implies that the design must have an apparent tendency to run in one direction. I may say regarding the "repeat" of designs that the drop match is always preferable to the straight match whenever it is practical.

I propose to describe briefly the chief varieties of carpets, and will begin with what William Morris called real carpets, by which he meant wholly hand made ones. To this class belong the carpets of India, Persia and Asia Minor. Widely different varieties are made in the different districts, ranging from coarse makes with less than 16 points or tufts to the square

inch to as fine a pitch as 700 points to the square inch. In most cases the carpets are made with a "pile" or velvet surface. The loom used is a very primitive arrangement, consisting simply of two horizontal beams or rollers fixed at top and bottom of two upright supports. Around the rollers the warp threads are wound and stretched. The pattern is formed by knotting wool, silk or cotton, as the case may be, around the warp threads. After each row of tufts forming the pattern is tied in, a simple arrangement permits the weaver to draw forward every alternate thread of the warp while the weft is passed between them. The row is then beaten down firmly with a heavy wooden comb.

Carpets without pile are woven from the back, the wool of each color in the pattern being wrapped around the warp when required, and then passed at the back to the place where it next appears, or cut off if the interval is considerable. Most of the designs now being produced in the Orient are wearisome repetitions, devoid of individuality or vitality. The reverence the public has for the productions (good, bad or indifferent) of the Eastern looms is quite touching. The Oriental weaver may be as careless as he or she may please; their mistakes give character to the carpets. The beams of their looms may sag with the tension of the warp and so produce carpets that will never lie flat—and the retail dealer will assure you that that is one of their special charms. They may use the most hideous colors that dyes can produce, and they, too, are charming. And all because two or three centuries ago the Oriental weavers made carpets that weave a magic spell around us yet.

But hand-made carpets are by no means produced solely in the East. I believe that as many are now made in Europe as in the Orient. There is but little difference in the way in which the small tufts of yarn are put into the carpets. In the European goods the tufts are not actually knotted as in the East.

Turning now to machine made carpets; the class that offers the widest scope to the designer and allows him the greatest freedom, especially in colors, is the axminster. This term covers all carpets in which an unlimited number of colors can be used. Axminsters can be divided into chenille and royal axminster. Chenille carpets owe their name to the weft, which consists of a continuous string of "fur." This is set into the warp, being carried or thrown from right selvedge to left and left to right, alternately, throughout the length of the carpet. Two distinct looms are used in making chenille carpet, the first, known as the weft loom, being used to produce the "fur," and the second or setting loom, for weaving the body of the carpet and setting the weft of fur into it.

The process of weaving the fur is very interesting. As soon as the design, carefully and clearly painted on proper ruled paper, is received from the designer, each horizontal row of points is numbered on margins left for the purpose; all the odd numbers running up one side against every other row, and all the even numbers up the other side, against the alternate rows. The design is then cut up into strips. This necessitates very durable design paper being used, and most firms use a paper which consists of three thicknesses, the middle one being cloth. The strips of design are then given to the weft weaver, who weaves a sort of webbing, which reproduces the design as it appears when the narrow strips into which it has been cut are placed end to end in the order in which the marked numbers run. The weaver, commencing with the first strip of the design, selects a shuttle of yarn matching the color of the first point; this is shot across the loom, and tied in with the warp threads; then the color of the next point is selected, and so on point by point until the whole of the design has been "read off" and woven into the web. The next process is the cutting of the web longitudinally into narrow strips of fur, when it is ready to be transferred to the setting loom.

in which it is used as a surface weft, and is bound by warp threads on the back or body of the carpet. The chenille loom is adaptable for most qualities of material, and to coarse or fine pitch. Ordinary makes vary from fifteen to eighty points to the square inch. The "pitches" are very variable, most manufacturers having their own standards.

The other class of axminster carpets, of which the "royal" may be taken as the type, differs entirely from the chenille as regards the processes of its manufacture. Many forms of looms are in use, but the general principle is similar in all. In the first place, only one loom is used, the first, or weft loom, being dispensed with. The design, instead of being woven into a continuous strip of "fur," is "set up" on a series of long bobbins or spools, 27 inches being the ordinary standard width for carpets woven in breadths—that is the usual length of the spools. Around these spools, as many woolen yarns as there are points in the width of the design are wound side by side, the colors of each of the yarns, of course, matching the corresponding points on the design paper. Thus each spool represents one row of points from selvedge to selvedge, and to reproduce a design as many spools will be required as the design contains points in its length. The ends of yarn as they leave each spool pass through series of small tubes, or some similar arrangement, from which they are fed row after row into the body of the carpet as it is woven. The processes of cutting off and tying in the little ends of yarn vary in the different makes of looms, but it is unnecessary to detail them. In these makes of axminster the design is for all practical purposes reproduced precisely as it appears on the ruled paper. There is therefore in theory very little to hamper the designer in the expression of his artistic fancies. Given a sheet of ruled paper of the proper pitch—5, 7, 10 shot, or as the case may be—he can proceed to fill in form and color at will. In practice, however, it is necessary to add, the designing of these carpets successfully is a task of surprising difficulty, and few persons—except, of course, the amateur, whose 'prentice hand is in exercise for the enlightenment of the trade—would consider themselves past masters in the matter without many years' experience. I know of nothing in the whole range of applied art that makes a greater demand on the designer's skill as a colorist than an axminster carpet. If a designer has not a fine sense of color and a practical sense of how to apply it, he will be forced to exercise his talents in some other direction. And this practical knowledge of the use of color includes many things that can only be arrived at by extensive experience and close observation.

The next class of carpets to consider is that which includes brussels and wilton. Poor, long suffering brussels, that has for years borne the contempt and miscalling of professing advisers of would-be possessors of artistic homes—especially those who least understand the real merits and demerits of the various makes of carpet! A year or two ago, one might have thought that all the periodicals of a certain class were leagued in a crusade against it, to judge by the condemnatory adjectives for which the dictionary was ransacked whenever brussels was mentioned. No wonder that it scarcely retained enough self-respect to hold up its head in the world. However, its days are not ended yet, and I very cordially put in a few words in its defense. Of course, I do not for a moment claim that it is or can be a tapis de luxe, but for positions where a strong, cleanly carpet, capable of standing hard wear, and in which the colors are as fast as one can reasonably expect, there is no carpet to equal brussels. Then, viewed from an artistic standpoint, while it is true that it cannot give the softness and richness of axminster, it is none the less true that its possibilities of vulgarity in color are much more restricted. It lends itself most naturally to refined designs and quiet, simple colorings.

Brussels differs entirely from hand-

made carpets and axminsters in its manufacture. It is composed of a certain number of layers of yarn forming a solid warp, these layers being technically known as "frames," because the bobbins required for each layer fill a separate frame at the back of the loom. The yarn of each color used in a brussels continues through the whole length of the carpet, whether it appears on the surface or not. The number of frames may be from one to six, but five frames is the generally accepted standard of "best brussels."

Each frame, of course, counts for a color in the design if the colors are used "all over," but in the majority of cases one or two of the frames are planted, that is to say, several colors, or shades of color, are arranged side by side, according to a "plant," or index, supplied with the design by the designer. The pattern is produced in the loom by means of the jacquard, which lifts to the surface whichever frames are required, and allows the other yarns to sink out of sight to the back of the carpet, where they are firmly bound by the weft threads and form the strong, solid backing which makes brussels and wilton carpets so durable.

As far as the designs are concerned brussels and wilton are practically the same. They are produced on the same looms and they owe the difference in their surfaces to a slight change in the process. In brussels the threads, or, rather, yarns, which the jacquard brings to the surface to form the pattern pass over stiff wires, which when withdrawn leave rows of little loops. In wilton the wires that are used are flattened out at the end and sharpened into keen little knives, which cut through all the loops as the wires are withdrawn, leaving a rough, velvet surface, which is afterward trimmed up evenly in the shearing machine.

Textile Plants in Paraguay.

Cotton grows in Paraguay all the year round. The land and climate are favorable for its growth. The cotton plant, after it has produced, is cut down, and from its root grows another plant. It is always better to plow up the plants, roots and all, at the end of each second year and plant anew, as finer cotton is the result.

The United States Consul at Asuncion writes to the State Department that the government is showing every possible interest in cotton growing. The Banco Agricola, a government institution, buys all the cotton, giving $4 Paraguayan money (50 cents gold) for every arroba (25.35 pounds) with seeds and $13 Paraguayan paper ($1.82) for every arroba without seeds. The bank spent, in 1897, $15,025 in this line; of this, $7,131.30 was for implements, etc. The farmer can always have ready sale for his cotton.

Several kinds of cotton have been introduced for trial, and they have produced satisfactorily; some of our plants have been giving good results.

Sansaverde is a fibrous plant which grows to a considerable extent in Paraguay. It is black, but after having gone through the machine it comes out white and silky. Damp soil is favorable for its growth. It has no thorns, which facilitates its gathering.

The fibre—white, glossy, and strong—might be employed in imitations of silks.

Caraguata is another fibrous plant of more prolific growth than sansaverde. It grows better wild than cultivated. The hills are covered with it. It has many thorns and is difficult to gather. The plant is cut down, and from the roots springs a new one.

This plant is used for making heavy rope. It grows everywhere, awaiting the hand of the gatherer.

A machine to separate the fibre, wash it, etc., would be welcomed here.

—The English were more sensitive about the nascent woolen manufacture in America in colonial times than about any of the other industries which were at the same time pushing their roots quite as deeply into the soil.

KNITTING DEPARTMENT.

The Knit Goods Situation.

Naturally enough, "The American Knit Underwear Association" is the liveliest topic of conversation in knit goods circles. Of course the combine includes only manufacturers of fleeced-lines, which have been especially over done, following the immense growth therein of recent years. It is well to remember that an absolute policy has not yet been marked out. The committee on scope has submitted a plan to the executive committee for action, which has yet to be taken. However, the views of the committee on scope fairly represent the consensus of opinion among the members, who may be expected to adopt them in part, at least, or others in the same tenor.

Those not in the combine are as usual decrying it, but if the 50 odd firms interested hold firmly to their plan for any length of time the outsiders are likely to be the first to weaken. The association, however, has plenty of work before it. Its avowed object is to maintain prices consistent with advances in raw materials. To accomplish this a series of advances in price is advised—probably the most serious step that could be taken.

Experience has shown that the best method of compassing such an end has been by indirect or partially indirect means. Mutual agreements for maintaining qualities, sample regulations, uniform procedure as to sales, time allowances, etc., have proved most efficacious as entering wedges, and have afforded leverage for later price requirements. Combinations based wholly on price advances, in the past, have put a cruel club into the hands of competitors, who have massed their energies at that single point. In such cases, too, qualities and the details of exchange being ignored, internecine strife has almost invariably cropped out.

But it is altogether too early to cast doubt upon the project. It contains many broad minded men who doubtless have reserve plans not yet outlined.

If brisk business would ever warrant an advance there has seldom been a better time. In no department has the run been more felt than in the cheaper fleeces, particularly in cotton. Manufacturers might have had an opportunity to get some advances on spring duplicates had they had an opportunity to turn out duplicates. Such a grist of goods were ordered however that there was no chance to run off any duplicates.

The demand for flat wool underwear is increasing, as it ought to have done long ago, but it is due more to the temporary scarcity in cheap fleeces than to legitimate improvement. Prices do not show the betterment that might be expected from the rush of business, nor is the outlook from the reports received from salesmen finishing their trips on summer weights, at all encouraging. The era of low grade goods is by no means over, as the extensive additions made to low grade mills the past summer shows. The importers have been doing well and with the upward tendency of raw wool they are growing more confident daily.

Hosiery men, too, have been extremely active, the last few weeks, particularly the importers, and no department has shown greater improvement than fancies. The strongly sustained foreign markets have materially helped home staple products. Ribbed, lace and extracted goods are more or less oversold. Seamless goods are in a better state and cashmere and other woolen goods are doing well, while the demand for full-fashioned still keeps ahead of the output.

It is worthy of note that the rise in wool is making it more and more difficult to make low price woolen and woolen mixed goods which can really compete with fleeces. Here is a factor that the manufacturers in fleeces, now in the combine, have not lost sight of.

Athletic goods, particularly sweaters, are in exceptional demand. Teamsters and outdoor laborers have adopted them until there is now an all-year demand for the goods. Various modifications of the sweater are already in sight and within conservative limits are sure to prove profitable goods.

The latest foreign advices are decidedly strong. Buyers are making concessions on delivery and price, which shows they need the goods. Manufacturers have from three to four months work ahead.

Stocking-Knitting Machine.

The accompanying illustrations relate particularly to stocking-knitting machines having a series of needle-guiding cams designed to engage with shoulders formed upon the needles to move them vertically during their rotation with the inner cylinder. In all of such machines a certain number of cams are provided for the purpose of stopping the needles in their vertical movement by engaging with the shoulders, so that as the machines are run at a comparatively high speed the needles will not be thrown upward too far. Heretofore the cams for this purpose—that is, stopping the upward movement of the needles—have been fixed to the outer cylinder, and when the rotation of the machine has reached a considerable speed the needles were thrown against the fixed cam with such force as to frequently break the needles.

The object of the present device is to provide cams for this purpose so arranged that they will yield slightly under the impact of the needles in their upward movement, whereby the machine is made capable of rotation at a speed considerably greater than has been possible heretofore without breaking needles, it being understood that the said cams are arranged to yield only a sufficient degree to cushion the impact of the needle-shoulders, but not to permit the needles to pass upwardly beyond the desired limit.

The illustrated mechanism consists in the construction, arrangement, and combination, with a knitting machine of this class, of one or more needle-guiding cams held in place by a yielding pressure device, whereby the objects contemplated are obtained.

We show a vertical sectional view taken through the central portion of the circular frame of the knitting machine, showing the various needle-guiding cams. Also a sectional view taken on the line AA and a modified form of the needle-guiding cam.

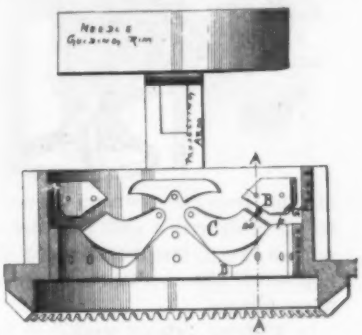
It is to be understood that the usual inner needle-bearing cylinder is inserted in the cylinder and that needles having outwardly-projected shoulders thereon are connected with this inner cylinder, and such shoulders are arranged to rest upon the shoulder shown. This shoulder has one or more downwardly-inclined portions, and pivoted guide-cams are connected with the frame to enter the downwardly-inclined portions of the shoulder.

All of these parts are of the kind now in general use.

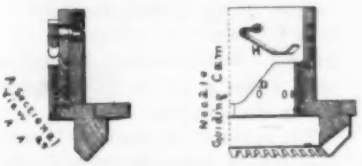
It is to be understood in this connection that the shoulders of the needles referred to travel on the top of the shoulder shown in a horizontal plane until they reach the pivoted cam C. Then they are forced upwardly by this cam and travel upon its top surface until they pass beyond it. When at this point, they are directed, by means of the usual switch-cam (not shown), to the under surface of the opposite one of the cams C. It is to be further remembered in this connection that all of the needles are in engagement with the yarn and that when they are drawn down by the cam the yarn pulls upwardly upon them, thereby holding the shoulders of the needles firmly against the under surface of the cam C and drawing this cam to its upward limit. The shoul-

ders of the needles never engage the surface D when in use.

When the needles have passed downwardly along the under edge of the cams C and then move upwardly to a point beyond the end of the cam C, it is obvious that if the machine is running at a high rate of speed the needles will be thrown upwardly with considerable force. It is of course necessary that the upward movement of the needles stop at the end of this cam and that they then move in a horizontal plane on top of the shoulder shown. To provide means whereby these needles may be thus stopped at this point and that without danger of breaking the needles, a cam B has been provided with a horizontal shoul-



Vertical Section



der on its under side E and with the surface F at one end extended parallel with the end of the cam C and also with an upturned end G. This cam is arranged in a position directly over the end of the cam C, so that the shoulders on the needles as they pass upwardly will strike on the under surface of this cam. Two pins are fixed to the cam B, projected horizontally upward through slots in the frame.

In the modified form of the needle guiding cam a solid metal cam B has been dispensed with, mounted on springs, and a cam has been substituted, the under surface of which is of substantially the same shape as that of the cam B. However, this cam is composed of a single leaf-spring, H, with its inner end securely fixed to the interior of the frame by means of screws, the other end being free to move vertically. This cam is arranged with relation to the cam C in such a manner that the impact of the needles will be received upon the under surface of the spring at about its central portion—that is, a slight distance from the point where it is fixed to the frame—and the spring is made of such resiliency that it may yield slightly under the impact of the needles when the machine is rotated at a high speed to a degree sufficient to prevent the breakage of the needles; but when the machine is running at a low speed the spring will not be affected, and at all times the spring will guide the needles in a proper manner.

In practical use it is claimed that with a machine provided with these improved cams the rotation of the needles may be increased to a very great extent, and therefore the efficiency of the machines will be greatly increased, inasmuch as less time will be consumed in doing the same amount of work than heretofore.

A Striper Attachment.

An ingenious mechanism for automatically throwing in and out of action various-colored yarns in the circular-knitting machine has recently been devised, the object being particularly to overcome the objections incident to the use of many devices of this class, wherein it is possible to employ only yarns of two colors effectively, by supplying a mechanism whereby a multiplicity of colors may be used in knitting a fabric, their action being positively governed by a pattern-wheel.

A further object obtained in the de-

vice is to throw a determined color out of action and sever it so nearly simultaneously with the insertion of a succeeding color that an almost inappreciable amount of "double knitting" results, and in so severing the yarn when out of action that the severing process shall not cause the undue tightening or drawing of stitches already formed with this color.

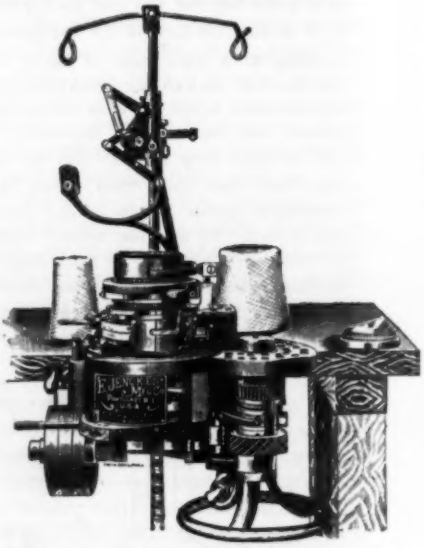
The Invincible Full Automatic Knitting Machine.

The Invincible Full Automatic Knitting Machine, recently put on the market by the E. Jenckes Mfg. Co. of Pawtucket, R. I., is shown in the accompanying illustration. It is designed for the economical production of all classes of seamless hosiery, is simple in construction and can be operated successfully by ordinary mill operatives. It is claimed to be the only full automatic machine made that is fastened to a bench, occupying no more space than semi-automatics.

A simple and positive attachment for putting in and taking out an extra thread in heel and toe automatically is applied to this machine, as well as an attachment for making high spliced heels and double soles automatically; at the same time the heel and toe are reinforced by an extra thread. Instead of a small cop, such as is usually used, the yarn for the splicing is supplied from a bobbin holding a quantity of yarn.

An important feature is the device for changing the yarn automatically at heel and toe, or at any desired point in the knitting of the stocking. This is a most successful yarn changer, being positive in its operation, and designed to fill all demands. No revolving bobbin is employed, but a full size winder bobbin or cone for each yarn.

Attention is called to the new method of transferring tops to the needles of machine in knitting half hose, and in footing ribbed leg hose. One cylinder only to each machine is required, the ribbed tops being picked on to a new and improved quill transfer ring, and this ring easily placed on the needles and the top transferred. By this method, which is entirely separate and



distinct from the ordinary method of transferring with a quill ring, not only is time saved, but it is claimed to be impossible to drop a stitch, even on the finest gauges.

In knitting "string work," a loose course is put in as a guide for cutting off each stocking. A loose course can be put in for looping the toes. This will be found of advantage in fine gauges. By changing the cylinders only, either a fine or coarse gauge of goods can be made.

The speed of the machine is reduced just before changing from circular to reciprocatory knitting, thus avoiding shock. All parts are interchangeable.

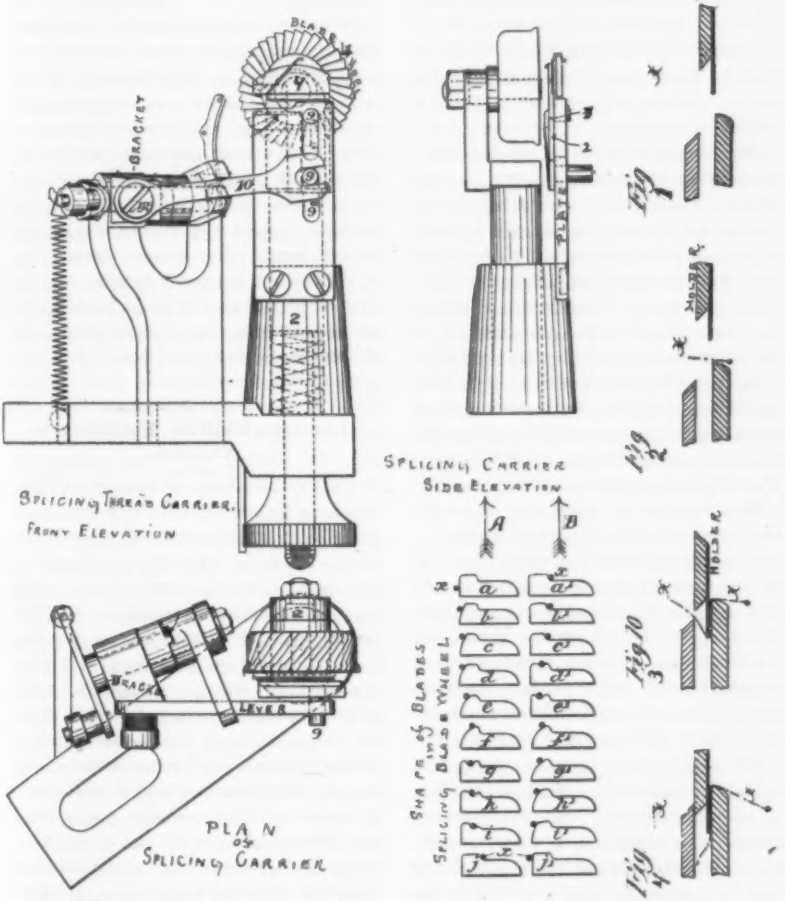
The Invincible can be seen in operation at the factory of the E. Jenckes Mfg. Co. in Pawtucket, R. I., or at their branch office, 370 Bourse Bldg., Philadelphia, where all inquiries will be cheerfully answered. The prices fixed for this new machine are most attractive and designed to meet the demand for a first-class machine at a reasonable price.

—In 1660 sheep in Connecticut were freed from the taxes paid by cattle, and grounds were ordered cleared for their pasturage. Ten years later every male over fourteen was required to work one day in June of each year in clearing away the underwood for that purpose.

—On January 11, 1884, the Japanese Department of Education issued general regulations for commercial schools. They were to be divided into two classes. Schools belonging to Class I. were to be of a practical nature, with the object of training persons destined for commercial careers.

Splicing Thread Mechanism.

The accompanying illustrations will be examined by many of our readers, as possessing a number of suggestive points of interest applicable to circular-knitting machines fitted with bearded needles and bladed knitting-



wheels. The object of these devices is to provide means by which a splicing-thread may be inserted and withdrawn with certainty and accuracy at any predetermined needle and at any particular course; by which the splicing-thread may be held in or out of its knitting position for any number of courses or parts of courses; for cut-

ting the thread and holding the cut end when the thread is thrown out of action, and for automatically controlling the action of the mechanism.

In the illustrations will be seen a front elevation of a splicing thread carrier, wheel, cutter and connected parts; also, a side elevation of the same, showing more particularly the thread cutters and holder; and a series of drawings showing the shape of the blades in the splicing blade wheel, as well as drawings showing the splicing thread carrier, cutter and trapper, in different positions.

The blade wheel is carried on a bracket of the usual description, and performs the functions of laying the thread on the needles, similar to blade wheels of the ordinary kind. The fixed cutter (1) is connected to a plate by a spring, as shown. On the inner side of the blade there is fitted a slide (2), to which a movable holder (4) and movable cutter (3) are attached. The slide (2) is fitted with pins which slide in slots, and is actuated by a lever (10) on the splicing-thread-carrier axle. The lever is pivoted on a bracket.

The number of needles in the knitting-head must be exactly divisible by the number of blades in the wheel, and as the splicing-thread is thrown into and out of action at opposite ends of a diameter of this wheel the number of needles upon which a splicing-thread is laid must be equal to half the number of blades in the wheel or some odd multiple of this number.

The shape of the blades at which the thread is thrown into and out of action is shown herewith, which represents consecutive blades in a wheel revolving in the direction of the arrows. The row A shows the blades at which the thread x is thrown into work. At blade a thread x is out of work, and as the wheel revolves the thread is moved across the blades until it enters the groove in blade g, which is the first blade to lay the thread on the needles. The blades h and i then guide the thread to the usual knitting position, as shown on blade j. The row B shows the shape of the blades at which the thread x is thrown out of work. The thread is moved from the knitting position shown on blade a′ to the groove in blade e′, which is the last blade to lay the thread on the needles. The thread is then moved over the blades f′, g′, h′, and i′, until it is out of work in the position shown relatively to the blade j′.

When the mechanism is in operation and the splicing-thread is to be thrown out of action, a cam, through levers, moves a carrier from its knitting position, Fig. 1, to the position shown in Fig. 2 and the thread is moved between the cutters and holder, which then commence to move. The thread is first trapped by a holder, Fig. 3, and is afterward severed by a cutter, Fig. 4. When the thread is thrown into action, it is first moved to its knitting position and then released from the holder, the loose end being controlled by a guide.

American Knitting Machinery in England.

The United States consul at Nottingham has written to the State Department, Washington, a very interesting report on knitting machinery in his district, to the effect that, since the introduction in England, in 1891, of the Scott & Williams patent seamless machine, an American invention for making circular seamless socks and stockings, nothing in the nature of revolutionizing processes has appeared; unless the overlock stitching device, an invention which has greatly improved the circular trade, and the Millar loom, can be so classed. Progress by way of improvement, however, and the application of ideas to new uses, all tending toward economy of operation and increased output at minimum cost, has been great. Another machine, patented, it is believed, by American inventors, for making striped seamless socks and stockings—a result not hitherto obtainable—is being introduced.

Prior to 1891, the best classes of

goods (sock and stockings) were made upon Cotton's straight, full-fashioned machine, which makes the goods in flat pieces, afterwards seamed to assume the tubular form. Up to this time, the only seamless stockings and socks manufactured in England were made on machines of the Griswold type, which had to be worked by hand, requiring a girl to work each machine. Consequently, production was slow, and only coarse-gauge goods were turned out. The Scott & Williams patent seamless machine produced a new article, which the trade took to very slowly and reluctantly, but it gradually got upon the market, and the public soon found out the comfort of wearing seamless goods. The demand for seamless machines rapidly increased, and other American patented machines of a similar class were introduced here. This had the effect of greatly decreasing the demand for full-fashioned seamed hosiery, and such machines fell out of use, except for the very best class of goods and for striped hosiery, which can not be made on the seamless machines. Seamless machines are now more extensively used than ever. Cotton's straight full-fashioning machine has gradually been improved to make the French foot, the Niantic or seamless foot, and stripes of a great number of colors; also, to make fancy open work or lace hosiery; also for making drawers, shirts, combinations, etc. Since the last United States tariff came into operation, a growing demand for these machines has sprung up in this country, and many of the leading manufacturers are putting down this class of machinery. Cotton's straight full-fashioned machine and the straight rib-top machine—for rib tops of socks, ribbed cuffs of sleeves, ribbed bottoms of drawer legs, glove fabrics, etc.—are the machines mostly required in the American market. Of the latter, a large number is sent to some of the best manufacturers in the Boston district. Of late years, underwear of natural wool has come into great demand, and by the use of the improved sewing machines, such as the overlock machines, these goods are largely made out of tubular fabric on circular machines, such as circular shirt body and sleeve and web machines; but machines for similar purposes are made in America, and consequently, there is not much opening for English apparatus of this class. Another machine, invented in America, is the Millar loom—a machine having a warp, weft, and knitting threads, of very rapid production, producing cloth for men's clothing, etc., such as is made on looms in Yorkshire. It also makes blankets. A plant of these machines has been built and is just commencing to be worked in Leeds. If successful, some say it will revolutionize the weaving trade in woolen goods.

Unfortunately for English knitters, builders of the Cotton machines are not able to compete in price with the German builders of these machines, owing principally to the lower wages paid and the longer hours worked in German machine shops, wages being 30 to 40 per cent. higher in English works than in Germany. There are a few of these machines shipped from this country to the United States, but the greater number is bought from Germany.

The introduction of a multiplicity of minor improvements has shortened the usefulness of many older machines, and replacements seem to be necessary almost constantly. Nearly all of the machinery in use in the Nottingham district is of local manufacture, either from English or foreign patterns. Of the machines in most general use may be mentioned Cotton's, which was first introduced in 1866, for making fashioned hosiery in cotton, wool, worsted, or silk, and the principal English patent upon which has expired. Its productive capacity has been increased and many improvements added from time to time, upon which patents still hold, and it is now built in any desired gauge from sixteen needles in 3 inches, or

8 gauge, to seventy-eight needles in 3 inches, 39 gauge. Then there are the Scott & Williams and other similar seamless machines. Among other modern machines in use (all manufactured in Nottingham) are: drawers machine, in various widths, from which a number of pairs can be turned out, from the smallest to the largest; machines for hose, half hose and socks, with apparatus for making the instep, finishing off the toe, splicing or thickening the heels, using various colors of yarn, etc.; machines for producing the bottoms or soles of hose separately, and also the instep; straight rib-top machines for making tops for the socks, cuffs, and ankles produced on straight-fashioning machines; circular stocking machines, for producing a tubular web, afterwards cut into suitable lengths for stockings; circular sleeve machines, circular body machines, and circular web machines for making both the bodies and sleeves of undershirts, etc. In the form of auxiliary appliances are produced stitching machines; circular latch-needle machines, for plain ribbed, mock seam, and striped goods; steam presses; winding frames; hose-rolling machines; hose cutting machines; wheel-brushing machines; turning off and seaming machines; welting machines; and other accessories of hosiery manufacture. The over lock stitching device has had a phenomenal success since the date of its introduction, about four years ago. Besides a general agency here, continental agencies are maintained and traveling representatives cover the field. At present, some eight or more different types of this machine are in use, for application not only to hosiery, but to the edging of lace curtains and a number of specialties. The keen competition among manufacturers has necessitated its use, both as a matter of economy and to improve the character of output for a discriminating market. Another improvement has been on the market here for only three months, and is rapidly becoming an equal necessity to the progressive and successful manufacturer. This is an ordinary—or rather extraordinary—lock-stitch sewing machine, applicable to hosiery and similar manufactures. It is driven by power at great speed, and reaches a working speed of four thousand stitches a minute. The importation of these machines is a tribute not only to American genius of invention, but to the unsurpassed excellence of the American mechanic. A careful review of mechanical improvements in hosiery and related industries discloses that, with the devices of Scott & Williams, and others, and the adaptation to other uses of the ideas they involve and suggest, the chief development of the past decade must be credited, not to the old home of weaving and knitting, but to the transplanted field of the future—the United States.

An Interesting Knitting Machine Exhibit.

MAYO KNITTING MACHINE AND NEEDLE COMPANY.

The exhibit of automatic seamless knitters, at the International Export Exposition, Philadelphia, of the Mayo Knitting Machine and Needle Company, Franklin, N. H., has attracted considerable attention, as presenting most valuable features in knitting machines. The merits of this concern's well known Acme machine have been long known and held in popular esteem among hosiery manufacturers. So fully are these recognized that this company has been obliged to operate its extensive plant overtime for more than a year, and now it is running its machinery both day and night with two sets of hands, in order to meet an accumulation of orders. This company have, in connection with their machine works, a thoroughly equipped plant for making latch needles for their own, and other machines.

—The introduction of the carding-machine was greatly expedited by improved methods of making the card-clothing.

SILK DEPARTMENT.

Broad Silk Warping.

Warping is the process of putting a given length of a number of silk threads on to a loom warp beam. The machines used for this purpose are termed "warping mills," and are of four descriptions. One of the mills formerly and now used for ribbon warping is termed a hand warper, as seen in the accompanying illustration. The most generally used warping mill at present is what is termed an "horizontal warping mill," and is constructed in somewhat similar manner to the hand warper, and, as the name implies, is placed horizontally in frames, with friction and driving mechanism, attached thereto. The machine illustrated will measure about three yards in circumference, while the horizontal mills in present use will measure some twelve yards in circumference.

Another style of machine is known as a Swiss power warping mill, and is of somewhat similar construction as the foregoing.

The fourth style of mill is a drum warper, for ribbon warps of light counts.

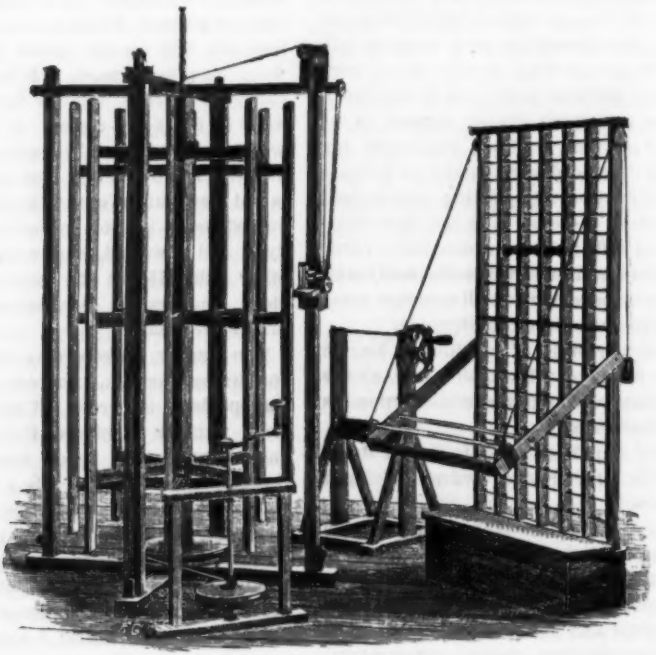
We will assume that a warp of 8000 threads, single, 250 yards long, is required, and the warping mill is an horizontal mill. If the silk is of a small lot and has been wound so as to fill as many spools as will hold it, the warper must use his judgment as to the number of spools to work with.

A fair sized creel will hold 250 spools. A full spool of medium count of silk will hold about 15,000 yards, and 250 times 32 is 8,000; so that if exactly 8,000 yards were put on each spool, and 32 sections of 250 yards each were assembled on the warping mill, a warp containing 8000 threads, each 250 yards long would be produced. But if such close figuring was followed, disappointment would often occur, and the last section would often be too short; as, if only the shortest of knots were made to connect each section to the warping mill, and to connect the warp to the beam, sufficient shortage would be caused to effect the length of the last section, and it would be almost an impossibility to positively order the exact quantity of silk to be dyed to exactly make 8000 threads 250 yards long; and to put on 250 spools exactly 8000 yards. A margin, therefore, is always allowed and more or less silk left on the spools after the warp has been made. Silk, by the time the warper handles it is worth some 30 cents per ounce. A warper's wages are from 15 to 30 cents per hour. The silk left over after making a warp is not lost, but an extra expense is incurred as it has to be reskeined, redyed and rewound, and warped with other silk. Hence the importance of close and exact calculations when profits are small.

The warper, on receiving the spools containing the silk, proceeds to place the spools in the creel. When the desired number is placed thereon, the ends from each spool are passed through a rack, in which is a series of glass pins, between which the threads pass, and are guided as they leave the spools. The threads are then led through a lease reed, in which the dents are alternately soldered up and down from the centre; folding shutters, provided with glass-bearing rods, being secured on the back of the lease reed. The threads are led forward through a section reed, in which they are drawn to conform to the width of warp section it is desired to make. If the section reed is 50 dents to the inch, five threads to each dent would allow each section to be one inch wide; and 32 sections of 250 threads, 50 reed, 5 threads in a dent, would make a 32-inch wide warp.

When the threads have been passed through their several reeds, the ends are gathered together and tied in a knot, and hooked on a pin of which

there is a series, provided in one of the rails of the warping mill. One of the shutters is opened and the warp threads are pressed or raised, causing the threads to be divided. A rod is placed between the divided threads, the shutter is closed, and the opposite shutter opened, and the warp again raised or lowered in the opposite direction, a second rod being inserted. The cross or lease thus made is held therein by means of a cord secured to the warping mill, which, when it has been passed between the warp threads in place of the rods, is again secured at its free ends to the warping mill. The warper presses on a lever provided therefor, and starts the mill; remaining in that position watching the threads as they are being wound on the warping mill, remedying any defects in the silk, such as long ended winders, knots, snarly places, and piecing broken threads. When the required length has been wound on the warping mill, which is denoted by a dial and bell, the section of threads is cut in two, knotted and secured to the mill by being passed between the section threads on the mill. Opposite, severed ends are knotted, secured to the mill and a cross taken, which is secured by the cord attached to the mill, as previously mentioned. The section and cross reeds are then moved along the mill to the desired position for the next section; the reeds being secured on a carriage provided with means to be moved as desired. This operation is repeated, section by section, till the warp is completed. The creel is also arranged so as to be moved along the floor, and same angle maintained between mill and creel for each section. As the last section is being approached, the spools will have but a small quantity of silk on them, so that, if only the bare amount of silk required has been provided, the last section will be in danger of running short in the number of threads, and in length of section. To avoid this, the number of threads are reduced, and the spools thus secured are used to piece out any short spools that there may happen to



be. Thus, while there may be a few threads short in the number required, the threads on the mill will be of an even length.

When a sufficient length and number of threads have been assembled on the mill, the warp beam is placed in brackets on the opposite side of the mill. The beam is generally and preferably provided with an apron of strong material, in the loose end of which is sewn a deep hem. Longitudinal slits are then cut, half the depth of the hem, through which an iron rod is passed, and the knotted ends of each section secured to the rod between the slits in the apron.

The friction band is placed on the warping mill, the foot lever is pressed, thus applying power to the warp beam, and the warp is then transferred from the mill to the beam. At frequent intervals, wide sheets of heavy paper board are inserted between the warp and beam, and wound thereon. The object of the paper is to prevent the edges of the warp from spreading outwards. While flanges are in general use for all other materials, and even for some ribbon warps, they are not used for broad silk warps; and it is quite the general practice to use paper. Even when flanges are used, in the writer's long experience he has never seen a silk warp of any length and large number of threads, without having paper thereon. While he admits that it might be possible to dispense with the use of paper altogether, he would not advise its discontinuance.

During the operation of beaming, the warper removes rough threads, knots, etc., that may have escaped his previous notice.

When the whole of the warp has been wound around the beam, an outside paper is placed thereon, a warp ticket tied thereto, and the beam placed in a rack ready for the weave room.

A previous writer has said that a silk warp should never be placed on its end. A very good theory indeed, but in practice it is difficult to carry out, as a mill operating 600 looms, with warp beams 70 inches from end to end, and duplicate beams for each loom, the space required to hold the beam racks would prove a costly feature in a mill where floor rent is high.

The writer has seen as many as 150 beams placed side by side on their ends, in a rack, down the centre of a weave room. It may be imagined how much space would have been required to arrange them in a rack lengthways, and how the light would have been cut off from the looms.

The same process of warping is followed in the Swiss warpers, except that the sections are guided on by a traverse motion, which enables long warps to be made on a mill of small diameter. A special beaming frame is used for these mills; the warping mill being lifted from its frame, conveyed to the beaming frame, the warp wound on the beam, and the mill placed back in its frame.

The process of warping on the upright mill, as here illustrated, is somewhat similar to others, and done in sections; the length of the sections being determined by the number of turns of the mill; the warp in these mills being guided by pegs arranged on a bracket, which is automatically raised and lowered as desired. Warps made in this manner are necessarily held in a rope form, and for ribbons are wound direct onto ribbon warp spools; but, when intended for broad silk looms are made into chains, or wound on large rollers, then entered into a beaming reed, and wound on the loom warp beam.

The fourth style, or ribbon warper, consists of a creel, similar to the one illustrated, and a drum on which the ribbon warp beam rests and is rotated. As many spools as there are warp threads are placed on the creel, the threads passing through a lease reed and a front reed, in which the warp is drawn of sufficient width to equal the width between the flanges of the beam. The warp threads are then passed direct to the warp beam and wound thereon.

While there are a number of good stop motions for warping frames, there are very few in practical use, as warpers generally find it advantageous to attend closely to their work; and the spaces are such between the warp threads, as they leave the creel, that a broken end is easily seen.

CAMPBELL.

Silk Calculations.

E. F. F.

Within the last two or three years a few booklets have been published on the subject of silk calculations, with the praiseworthy intention of explaining its mysteries and difficulties to those not at all or not quite familiar with them. One of those little books, which has tried to attract attention in silk circles by a nicely gilded cover and rather extensive advertising is well stocked with common arithmetical, technical and practical errors.

Calculating can really only be learned by practice, and should be intrusted to those only who have a most thorough knowledge of the entire silk business.

This article will not presume to do what all other books on the subject have failed to do, heretofore, namely, make the subject plain to the layman, but will merely confine itself to a discussion of several methods of calculating and leave the readers to draw their own conclusions.

There are two distinct types of calculations, one, which given a certain cloth is employed to ascertain the cost of manufacturing it, and the other which given a certain price, is used to determine the best quality of a cloth to be constructed for the same. Either of these two types may be figured theoretically according to established standards (of which every mill has its own), and if a certain small percentage is added to allow for any errors in the mode of calculation, the resulting figures should come very near the truth.

Yet few manufacturers will, and none should, neglect to put those figures to the test, or, in more words, to verify them by making a practical calculation of the cost of the goods, of facts, while they are being manufactured. Any error will then be discovered easily and while such a discovery may be of no use for an order once accepted it will prevent the taking of a duplicate or new order, or should the error found really prove the cost to be less than anticipated it will of course facilitate the getting of new business. On the other hand it might prevent losses which for the time being would have appeared on the books as gains. In times when there was a big margin of profit, errors of one or two cents to the yard did not amount to much, at least did not change items from the credit to the debit column, but nowadays when competition is so keen that we have to figure with fractions of cents, it will be easily seen of what importance it is to add to the theoretical, that of the practical calculation. A number of manufacturers have thus carried on their business satisfied with the profits they were making (on paper), and were almost as much surprised as their creditors, when the final crash came.

Two or three months ago a story went the rounds of silk circles, that one of the newer concerns was desirous of selling its plant, having, during its two years existence, made miscalculations to the amount of $32,000. Although the story might have been unfounded, yet it is a fact that such a happening would not be an impossibility, especially as many people have of late years embarked in the silk business, who, having no knowledge of it themselves, tried to run it with a number of technical books and inexperienced management.

Given a certain cloth for calculation our first duty is to ascertain the exact construction of it, which means, how many threads in the warp, how many picks in the filling, what kind of material and its size, if pure or weighted

dye and what weave. Those are the important points to settle before we can proceed with our calculation. Most people interested or employed in the silk business (even the buyers) are able to count the picks in a cloth, as the same are plainly visible to the eye, through a magnifying or counting glass. Different, however, is it when it comes to counting the threads in the warp, unless the weave be taffeta or gros grain, in which case they can also be easily counted under the glass, with the possible assistance of a fine needle. When, however, that ground weave is composed of surahs, serges, satins, armures, or other fancy weaves, and the count runs up into the 400s (or 700s as in some double face ribbons), the only way of counting the warp will be by counting the repeats of the weave and multiplying those with the number of ends in a repeat. To be able to do that, we must of course be in a position to read the weave, which, excepting the very simple ones, can be done by the expert only.

Much easier it is to determine the kind of material used in the construction of the cloth, as the different fibres used for weaving are, as a rule, easily recognized and distinguished from each other. In any doubtful case, however, raw silk will dissolve itself into a bluish looking jelly if treated with copper oxide ammonia, which is an undisputable proof of its character.

Silk once dyed and woven, no human being will be able to say positively that it was of Italian, Japanese, Chinese or other origin, but experience alone will tell the calculator which kind it would be most advantageous to use for the cloth under examination. The determination of the size of the warp and filling thread is another point requiring much careful judgment if conscientiously done, since we have to distinguish between what is silk and what is dyestuff. By taking a few ends of threads from the cloth and dipping them into a very mild solution of sulphuric acid and then rinsing them in clear warm water, we will be able to get most of the weighted dyestuff off the thread thus leaving it in almost its natural size, which again, we will compare with other threads, the exact size of which we know. By these means we are enabled to get pretty near to the truth if practice and experience can be combined with the above manipulations.

Not only must we know the construction of the weave, so we may ascertain the number of warp threads in the cloth, but as different weaves take up those threads more or less, we also have to know it, in order that we be able to fix a percentage for that taking up or "weaving in" as properly called.

In taffetas, where the thread is bent over every pick (once above, once underneath), it is plain that more thread will be woven in in a yard, than in an eight shaft satin, where the thread is bent over every 8th pick only. As the tension of the warp also plays an important part during this weaving-in process, we must again leave it to experience to determine its percentage in comparison to the whole length of the warp. A fair average will be 10 per cent. in taffetas and about 7 per cent. in five to eight-shaft satins.

Being now sure of all the above points and conclusions, we will proceed to the real part of the theoretical calculation of which we give a sample here. In substitute for the real cloth, we give an exact description of it below:

Quality: Figured satin brocade.

Material: Warp, 1 end 28/30 den. 2 thd. Italian organzine, 24 oz. black.

Material: Filling, 3 end 45 den. 3 thd. Japanese tram, 24 oz. black.

Width: 24 inches.

Yards ordered: 200 yards.

Count: Warp, 240/1 threads to 1 inch.

Filling, 96/3 picks to 1 inch.

Edges: Two a 40/2 of same as warp.

As—satins (like other weaves)—will

"spring-in" or shrink in width when weaving, we have, in order to get a 24-inch cloth, to figure for 24½-inch warp, which will, inclusive of the edges, allow for a shrinkage of about ¾ inches, which is all it should be, if the tension on the warp and filling is right. To weave 200 yards of satin we need 200 + 14 (7 per cent.) = 214 yards of warp as explained before. Having 240 ends to 1 inch, we will have 240 × 24½ (width) = 5880 ends to 24-inch cloth, plus edges (2 × 40/2 = 160/1) or 5880 + 160 = 6040 ends in the total width of the cloth. As we need 214 yards of each of those ends in order to make the full length of the warp, we will need 6040 × 214 or 1,292,560 yards of 28/30 den. organzine.

To establish the quantity of filling we proceed thus: We have 96 picks to one inch, this is 96 × 36 (1 yd.) or 3456 picks to one yard, or 3456 × 200 (yards of cloth) = 691,200 picks to 200 yards. Each pick being 24 inches long, this will give us 691,200 × 24 (inches) or 16,588,800 inches, or (divided by 36) 460,800 yards of filling. The same being 3 ply, however, we actually need 3 × 460,800 = 1,382,400 yards of filling (45 den., 3 thd. Japanese tram).

Having obtained the number of yards of silk thread, which we will need to produce the cloth, we next have to figure, how many pounds the required number of yards will weigh, proceeding thus:

Warp: 1,292,560 yards of 28/30 denier, 2 thread organzine.

It must be observed here that the size (thickness) of a silk thread, while also expressed by a number, is measured just in the opposite manner from all other fibres. Thus while, for instance, the number of a cotton yarn always expresses how many skeins of a certain length will weigh one pound, the number (titre) of a silk thread expresses how many units of a certain weight (denier) a skein of a certain length will weigh. We therefore see, that, in cotton, number one will be the thickest; in silk it is the finest thread. Silk, in all countries but the United States and England, is measured with the international denier, which calls 500 meters of silk, weighing 0.05 milligram, one denier. Consequently a titre of 28/30 deniers means, that 500 meters of silk will weigh 29 (average of 28/30) × 0.05 milligrams or 1.45 mg.

In the United States and England we express the size of silk by the number of drams a skein of 1000 yards will weigh.

As a skein of 1000 yards length, and weighing 1/16.68 or 0.059 drams, is of the same proportion as a skein of 500 meters, weighing 0.05 milligram, we get the American titre of a 28/30 organzine by multiplying 0.059 (dram) × 29 (average of 28/30) which gives us 1.74 or 1¾, as we would call that particular silk. As most every man, having to do any calculating, will have his graduated lists of all European titres transposed into drams, he will not have to go through this preliminary figuring at all. Wanting to know how many pounds 1,292,560 yards of 28/30 organzine will weigh, we will, knowing that 1000 yards of it weigh 1.74 drams, divide 1,292,560 by 1000 = which gives us 1293, and then multiply this with 1.74, as 1293 × 1.74 = 2249.82 drams.

Before figuring how many pounds those drams are equal to, we must now add 5 per cent. of the weight, in order to allow for waste made during the different manipulations of the silk: 2250 + 113 (5 per cent.) = 2363 ÷ 16 = 147 ÷ 16 = 9 lbs. or, more accurately, 9 lbs. 3 oz. 11 dr., which we shorten by making it 9¼ pounds required to make the warp for the described cloth.

The weight of the filling is figured in the same manner, only will we this time show, as an example, how the European titre can be figured into drams (if no graduated tablets are at hand), during the progress of the calculation.

Filling: 1,382,400 45 denier Japanese tram.

1,382,400 (yds.) ÷ 1000 (yds.) = [1382

× 45 (titre)] ÷ [62,190 ÷ 16.68 (drams)] = 3728.4 drams.

3730 (drams) + 186 (5 per cent.) = 3916 ÷ 16 = 244 ÷ 16 = 15 lbs. 4 oz. 12 drms.

We will need 15 lbs. 8 oz. for our filling (round figures).

Having obtained the exact weight of the raw material that we will need, we can continue our calculation, which now resolves itself into a question of costs and wages. In the example given below, the costs and wages must not be taken as standard prices usually paid, but they are taken at random and serve only their purpose of demonstrating the manner of proceeding.

Warp: 9 lbs. 4 oz. 28/30 d. organzine. Raw silk $5, throwing 75c., dyeing 50c. = $6.25	$57.81
Filling: 15 lbs. 8 oz. 45 d. tram. Raw silk $4.50, throwing 75c., dyeing 50c. = $5.75	89.13
Winding: 24 lbs. 12 oz. at 12c.	2.97
Warping: 6040 ends at 1000 ends, 8c.	4.83
Picking warp: 214 yards at 1c.	2.14
Twisting: 6040 ends at 1000 ends, 25c.,	1.51
Weaving: 200 yards at 12c.	24.00
Design or cards: 200 lines or cards at (line 4c., card 1c.) 5c	10.00
Cloth picking and finishing: 200 yds. at 4c.	8.00
	$200.39
Mill expenses, 10 per cent.	20.04
Cost of 200 yards of cloth	$220.43

Cost of 1 yard = $220.43 ÷ 200 = $1.10¼.

The percentage of the mill expenses is obtained by taking all monthly or yearly expenses, which are not included in this estimate as, for instance, wages of foremen, clerks, engineer, etc., coal, water, interest on building and machinery, insurance, etc., and dividing them by the number of yards manufactured during the period of a month or year. By thus figuring the average cost of all goods produced, we can easily establish our percentage.

The above calculation is, in its principles, as correct as it can be made on paper, yet when actually fabricating the goods, the saving of a cent here, or the loss of one there, unforeseen at the time of calculating, is liable to change the aspects of the whole, especially if it is not a question of 200 but 2000 or 20,000 yards. Therefore it is wise to submit our theoretical calculation to a practical test, which might be conducted in the following manner.

The raw silk brought to this country consists of a single thread (which under the microscope will show to be really two threads), and is in this state very little used for weaving purposes. As a rule, the silk has to undergo a process called "throwing," the uniting by spinning of 2, 3 or more such single raw silk threads into one. Thus, if we need a 28/30 organzine, we will buy a 14/15 raw silk and get the desired thickness of the thread by spinning these two together.

Before the silk can be thrown it is soaped to insure its better working, a process which does not interest us at present beyond the fact that the soap adds considerably to the weight of our silk, a factor which has to be taken into account when we give thrown silk to the dyer. For instance, if we were to give our 24 lbs. 12 oz. to the dyer, it is clear that some of that weight would be soap instead of silk, and in reality we have to give him more weight than our calculation calls for. In the usual run of business every mill will know how much to allow for the weight of the soap, and when giving out the silk will, for instance, instead of weighing 24 lbs. 12 oz., make it 27 lbs., allowing 2¼ lbs. for soap. However, when making a test case we will not give the silk to the dyer by the pound, but by the skein. As all throwsters in this country reel organzine into skeins of 20,000 yards, and tram (if not too fine) into such of 10,000 yards length, we can easily count our 1,292,560 yards of organzine by counting 1,292,560 ÷ 20,000 = 64½ skeins, and our 1,382,400 yds. of tram by 10,000 = 138¼ skeins. After counting the skeins we will weigh each kind of silk, which would be, for instance, 10 lbs. 4 oz. of organzine and 16 lbs. 12 oz. for tram.

This silk we will give next to the dyer, and as our order calls for 24 oz. black, this means that for every pound we gave him, he has to return

24 ounces (16 oz. silk and 8 oz. dye stuff), in weight. Consequently, in our example, upon being returned by him, the organzine should weigh 14 lbs. 14 oz., and the tram 23 lbs. 4 oz.

If we do not get this result, we will know that something is wrong either in our calculation, or in the size of the silk, or in the throwing or dyeing, or due to some other cause, which should be easily found if proper records are kept of all the manipulations the silk has to go through.

Furthermore, we might find that we have to pay more wages than anticipated, or that we cannot turn out the goods as fast as expected (increasing the expenses), or other errors, all of which should be noted and used accordingly in our new calculation.

We may find that from 214 yards of warp we are only able to get 196 yards of cloth, which in our example would increase the cost of one yard from $1.10¼ to $1.12½, or, on the other hand, we might get 204 yards of cloth, which would decrease the cost from $1.10¼ to $1.08 per yard.

In short, we have to follow up the reality as closely as possible, and then make our calculations from facts and not from established averages, percentages and probabilities.

As the second kind of calculation, the object of which is to construct the best possible cloth for a certain price is based on a reversal of the proceedings of the first kind, we will not enter into the details of it.

As mentioned several times before, calculation cannot be learned theoretically alone, but is a matter of long experience. I have known a manufacturer who could mentally calculate the cost of a piece of cloth, and do it almost as exact and about 10 times as quick as it could be done on paper. When it comes to having a leeway of a few cents either way, most of us will be able to make a pretty correct guess of the cost of goods shown to us.

But as in the management of a mill guesses have no room, proper calculation plays the most important part of a successful business.

Properly tabulated statistics, well kept books, daily loom lists, and monthly trial-balances are things without which, nobody can make a true calculation.

No calculation once made, should ever be destroyed, but it and a sample of the cloth should be collected and will be of great help for future reference to the man who has charge of that responsible work.

Selection of Silk Cocoons for Breeding.

Next after the gathering of the cocoons comes the necessity of making a most careful selection for reproduction, and no sheep breeder examines more carefully the texture and weight of the fleeces of his merinos than does the silk culturist the weight and shape of his cocoons and the silky fleeces that envelop them, always choosing the best formed and those heaviest with silk and entirely free from any taint of disease.

The cocoons intended for reproduction are carefully peeled; that is to say, freed from that silky foam that surrounds them in the wood. This is done that the moths at their coming forth may have no impediment. There is a machine called the pela bozzili that greatly aids in this part of the work, for when done by hand it is very tedious.

—Some day we shall have a historian who will trace the influence of the mill streams in the upbuilding of New England—not alone the large rivers like the Connecticut, the Merrimac, and the Androscoggin, which have made Holyoke, Lowell, Lawrence, Nashua, Manchester and Lewiston; but the smaller streams, like the Blackstone, Assabet, Hockanum, Cocheco, Concord, Naugatuck, Winooski, Quinebaug, Stony Brook, Piscataquis, Saco, Cochichawick, Shawshin, and others, which nursed these pioneer mills, as a mother her children.

POWER DEPARTMENT

ELECTRICITY—STEAM—WATER.

The Influence of Mechanical Draft Upon the Ultimate Efficiency of Steam Boilers.

Abstract of a lecture delivered before the Engineering Society, by Walter B. Snow, of the Engineering Staff of the B. F. Sturtevant Co., Boston, Mass.

(Continued from October.)

The typical boiler plant already presented will serve as an excellent illustration. Suppose it is determined to omit two of the twelve boilers, say one from each pair at the end farthest from the economizers, and to force the remaining boilers up to the original rating, which can be easily done by mechanical means, as a substitute for the chimney. This will decrease the rating to 2,000 h. p., or by 16⅔ per cent. The volume of air required per pound of coal, with the higher combustion rate, deeper fires, and mechanical draft under automatic control, will be somewhat less than that with the chimney, while, if the economizers remain the same, their capacity relative to the heating surface of the boiler will be greater, so that the ultimate waste by heat in the escaping gases will certainly not be increased.

RELATIVE COSTS.

2,400 Nominal Horse-Power Plant, with Chimney Draft.

12 boilers	$37,000
2 economizers	10,500
Boiler and economizer settings and by-passes	9,000
Automatic damper regulators and dampers	400
Chimney, including foundations	10,700
Boiler house	11,500
	$79,100

2,000 Nominal Horse-Power Plant, with Mechanical Draft.

10 boilers	$30,833
2 economizers	10,500
Boiler and economizer settings and by-passes	8,500
Boiler house	11,000
Mechanical draft plant complete	4,700
Saving by using mechanical draft	13 567
	$79,100

The original costs under the two conditions will be about as indicated in the accompanying table. A total possible saving of $13,567 is thus shown, of which $7,167 is due to the reduction in nominal horse-power made possible by the introduction of mechanical draft.

This points to one of the most important advantages of mechanical draft in connection with a plant subject to temporary demands for excessive capacity, as is for instance the case in the power plant of electric railway. For the sudden demand can be met by forcing the boilers by mechanical draft for above their rated capacity instead of by installing reserve boilers to meet these special requirements.

A problem that has to be faced sooner or later in most boiler plants is that of increased capacity. This differs from that just presented, in that the chimney already exists, and it becomes a question whether the desired result shall be obtained by forcing the existing boilers or by adding to their number. The former method demands an increase in intensity of draft, which, with a given chimney, operating well up to its capacity, can only be obtained by considerable increase of height at excessive expense, while, with either method, a larger volume of air is required. As a result, increased output frequently demands not only more boilers, but a new or higher chimney. Here mechanical draft steps in and presents a simple solution of the problem.

Considering the matter of increased output solely in the light of comparative cost between the introduction of more boilers or the introduction of mechanical draft, and disregarding any possible cost of change in the chimney, we may again take for illustration the plant of 2,400 rated h. p. Suppose it is desired to increase its capacity to 2,800 h. p., or by 16⅔ per cent. Then the relative costs under the two conditions will appear as here indicated.

RELATIVE COSTS.

2,800 Nominal Horse-Power Plant, with Chimney Draft.

2 additional boilers	$6,167
Setting, etc., for 2 boilers	1,250
Addition to building, etc.	2,700
	$10,117

2,400 Nominal Horse-Power Plant, with Mechanical Draft.

Fan, dampers and ducts	$1,500
Saving by using mechanical draft	8,617
	$10,117

The saving actually secured by providing surplus capacity in light, rapid running fans, instead of in ponderous boilers, and the higher efficiency of combustion obtained under proper arrangements with mechanical draft, is most clearly shown by experience in the merchant and naval marine. Here the matter of weight and of space occupied is of great importance. Every pound in weight or foot of space saved leaves just so much more available for coal and cargo.

We may now turn to that portion of our discussion which relates to the quantitative efficiency of a boiler plant.

No greater waste occurs in modern steam-boiler practice than that which is inherent in the employment of a chimney for the production of draft, namely, the loss of heat in the escaping gases. As the chimney depends for its action upon the maintenance of a temperature difference between the internal gases and the external air, it is manifest that, with a chimney, this waste can never be eliminated. It may be palliated, it is true, by the building of higher chimneys, so that the same intensity of draft may be obtained with a lower stack temperature. But such means of providing for the utilization of the otherwise waste heat is expensive. For instance, if, with an external temperature of 60 degrees and an internal temperature of 500 degrees, sufficient intensity of draft is produced by a chimney 100 feet high, it will require a height of 175 feet to produce the same draft when the temperature of the gases is reduced to 250 degrees. In addition, the means provided for extracting this heat will increase the resistance, and provision for overcoming the same will have to be made by greater chimney height.

In the case of a fan, however, the power expended as measured in heat units necessary to produce the same results, may, under ordinary conditions, be only about one seventy-fifth of that necessary with a chimney. In other words, the fan renders available for utilization practically all of the heat wasted by the chimney, while it possesses the further advantage of readily creating the additional draft required when heat-abstracting devices are introduced.

Messrs. Donkin and Kennedy, in seventeen independent boiler tests,

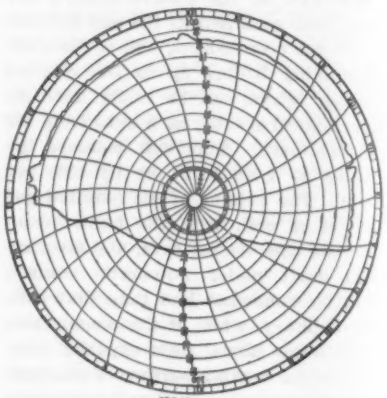


FIG. .

found the heat lost up the stack when no economizer was used, to range between 9.4 per cent. and 31.8 per cent. of the total heat of combustion. As it is not practicable to cool the gases to atmospheric temperature, it is evidently impossible to utilize all the heat, but the ordinary economizer should, with mechanical draft, show a saving of between 10 and 20 per cent.

The average results obtained by Roney from tests of nine plants thus equipped were as here presented.

AVERAGE RESULTS OF TESTS OF PLANTS EQUIPPED WITH ECONOMIZERS AND MECHANICAL DRAFT.

Temperature of gases entering economizer	526.3°
Temperature of gases leaving economizer	269.6°
Decrease in temperature of gases	256.7°
Temperature of water entering economizer	150.4°
Temperature of water leaving economizer	297.1°
Increase in temperature of water	146.7°
Fuel saving, in per cent	14.64

Although not developed to the same extent as the economizer, the air heater, by which the heat is transferred from the gases to the air supplied to the furnaces, has been introduced to a considerable extent with satisfactory results. In experiments with the Marland apparatus, Hoadley showed that the waste of the flue gases could be reduced to only 5 per cent. of the total heat value of the fuel, with an accompanying expenditure of only one per cent. of the steam generated for driving the blower.

The latest practice points to the introduction of flue air heaters for the abstraction of further heat from the gases after their passage through the ordinary type of economizer.

The importance of mechanical draft in the adoption of means for utilizing the waste heat, is well exemplified in the introduction of retarders and of ribbed tubes. Both of these increase the resistance and almost invariably require fan draft to enable them to create the saving of 5 to 10 per cent. which may be thus secured.

The facility with which the intensity of the draft and the volume of air supplied can be regulated when a fan is employed for draft production, has always been recognized as one of the most valuable characteristics of this method. Such regulation makes possible the most perfect distribution of the air and its reduction to the minimum amount which will produce satisfactory combustion.

Variable draft is necessary to maintain a constant steam pressure. This is evidenced by the accompanying charts from a mechanical-draft plant. Fig. 8 illustrates the practical uniformity of steam pressure maintained, while Fig. 9 indicates the considerable fluctuations in the intensity of the draft required. The operation of the fan is automatically regulated, so that the slightest variation in the steam pressure causes considerable change in the speed, and consequently in the draft.

For the mere chemical requirements of the combustion of one pound of ordinary coal, about 12 pounds, or 150 cubic feet, of air is required. But under the conditions of chimney draft, this amount is greatly exceeded. Donkin and Kennedy showed, in the results of sixteen tests, that the air supply ranged from 16.1 pounds to 40.7 pounds.

The effects of an excess of air upon the combustion of coal are such that the ideal temperature in the heart of the fire decreases with the excess, while the relative weight of the products of combustion becomes greater. Although the initial volume increases with the excess, it is to be noted that the relative volume just after passing through the fire remains practically

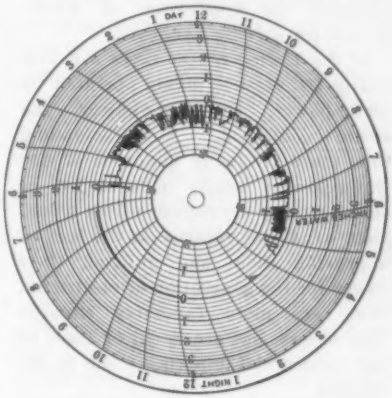


FIG. 9.

constant because of its lower temperature and consequent greater density.

As the gases pass onward through the tubes, they become cooled, but those of higher temperature part most readily with their heat, and at the same time, their volume and consequent velocity are reduced, still further facilitating heat transmission. On the other hand, the gases of lower initial temperature transmit their heat less rapidly, and the final result is that, within practical limits, the temperature of the escaping gases is highest with the greatest excess of the air supply.

(To be continued.)

—Prior to the coming of the Scholfields it is probable that wool carding by machinery had been successfully attempted in New England.

Water-Power Electrical Plants in the United States.

B. C. WASHINGTON, Jr.

The application of water as a power for driving mechanical devices is supposed to have been attempted in Rome, about the time of Augustus, 63 B.C. to A.D. 14.

The first transmission of electrical power for industrial purposes was accomplished in 1878, at Sermaize, a short distance from Paris, France. The dynamos in this instance were driven by steam engines. Shortly after this demonstration of the practicability of the transmission of electricity, followed the application of water-wheels for driving dynamos.

In the United States there are now nearly 500 electric plants operated by water-power, or water-power and steam combined. Notwithstanding this, there are many hundreds of fine water-powers totally undeveloped, or only partially developed, which would yield handsome returns on the cost of improving them and utilizing their power for the generation of electricity. Some are more favorably situated than others, but nearly all of them of any commercial importance can be developed.

The immense advantages of electrical development are its cheapness, the flexibility and divisibility of the power, and the ease with which it can be transmitted from the point of generation to the point of utilization.

As a power producer the stream must be reasonably steady in the quantity of its discharge. This can be readily determined by pursuing the accurate methods employed in stream measurements by the government hydrographers.

Having ascertained the fall, and the quantity of discharge, the amount of power that is available is readily determined. The next problem is the disposition to be made of the power when it is developed. This is often known in advance, but in some cases the power owners are confronted with many difficulties. The location of the power may not be suitable for a manufacturing site, and should it be desirable to transmit the power to manufacturing centres, existing power and light companies may own franchises which give them exclusive control of the territory. It is not always an easy matter to induce manufacturers owning expensive steam plants to discard them and substitute electricity, although they know it to be cheaper, more reliable, cleaner and generally safer than steam.

The problem of water-power development is, as a matter of course, one of dollars and cents, and the main question is, will the income be sufficient to pay a reasonable per cent. on the investment, over and above general and operating expenses, taxes, maintenance and repairs and depreciation? This question is referred properly to the engineers in charge of the prospective development. The development naturally divides itself between the expert in hydraulics and the expert in electricity. To these experts it remains to solve all the varied and sometimes exceedingly difficult problems that are presented. The machinery for these plants must be constructed to suit the conditions imposed, and the conditions are the unknown quantities which enter the equations and are only solved by experienced engineers. The up-to-date manufacturers of water-wheels and electrical apparatus employ the best of engineering talent, and this talent is at the disposal of those contemplating the construction of water-power electric plants. Upon the engineers devolve the selection of the site for the dam and power-house, and the preparation of plans and specifications for their building and equipment. The kind of dam and its location depend largely on the character of the stream, the shape and geological structure of its sides and bottom, and also the topographic features above and below the prospective site. Of course, dams are constructed to withstand extraordinary freshets and injury from ice and floating debris of all kinds, and of a height that will not cause disastrous results to surrounding property from

overflow or backwater. Proper protection is afforded canals, waterways and penstocks leading to the power-house, and ample provision made to keep sand and other detritus from entering the water-wheels. Local conditions are also important factors in the selection of the site for the power-house. When practicable, it is located as near as possible to the source of power, so that the expense for canals, flumes and penstocks will be reduced to a minimum.

The plan of the power-house depends largely upon the style of water-wheel used and the method adopted for delivering the water to the wheels and carrying away the discharge water, the connections between the water-wheels and generators, and whether the plant has additional or reserve steam power. The building and foundations for wheels and generators must meet every requirement of strength and solidity. The entire construction must also be fire-proof. No power-house is complete without a traveling crane.

Recent construction shows a very commendable desire on the part of engineers to standardize the building plans and machinery as far as practicable. The location of switchboards, transformers and outgoing wires are matters of detail for the engineers to decide. Currents of high voltage require extraordinary care in the placing and insulation of transmission wires, and the best methods in use will be shown later.

There are at present two styles of water-wheels in general use in the United States for dynamo driving, viz.: turbines and impulse wheels. As a rule, the use of turbines of the vertical and the horizontal style is confined to powers of ordinary head, where the water is plentiful. The impulse wheels are a necessity under opposite conditions. There are, perhaps, some exceptions to this statement, but we do not think them sufficiently numerous nor important to be cited at this time.

Both styles of water-wheels require the use of water-wheel governors, and this is especially true of plants where there is a variable load on the generators.

There are many different devices on the market for governing water-wheels. Reports from the plants show that the field is almost entirely covered by three governors. They give remarkably close government under all working conditions, and guard against excessive speed or racing in case of the whole load going suddenly off, as in the case of circuits opening.

The kind of generators used, of course, depends largely on the length of the transmission line and the work required. For all long-distance transmission, alternating current generators are used. The voltage of the current generated is raised by transformers and carried at high voltage to the receiving station, and there stepped down by lowering transformers and utilized for light and power purposes.

The pole lines follow roads when practicable, and when run across country the timber is cleared from both sides of the line, so that uprooted trees and limbs broken by storms will fall clear of the line. The poles and cross-arms are of selected timber. The poles are firmly planted and securely braced at curves. Special high voltage insulators are used. The transmission wires are bare copper, the high voltage permitting the economical use of light wires. The wires are spiralled, to prevent induction if telegraph or telephone wires are strung on the same poles.

A point which we wish to illustrate is that the use of vertical turbines and heavy gearing is necessary when the fall is not great and waste of water is not permissible. Thus, we give an example in which the turbines are belted to pulleys on the main-line shaft extending the whole length of the wheel-room and continuing through the partition walls into and along one side of the generator-room of the power-house of the Ponemah Mills, Taftville, Conn. This power-house is located at Baltic, 4½ miles

distant from Taftville. The pulleys are put into, or out of, action by clutches mounted with pulleys on quills, so that any one, or all, of the wheels can be applied to driving the shafts.

The belted generators are G. E. 250 kilowatt 3-phase generators, which deliver current to the line at 2500 volts. At Taftville the 3-phase circuits are led into the basement of the mill, where they drive two 3-phase synchronous self-starting motors. These motors furnish power for driving the 1700 looms, the lighting plant and three 80 horse-power G. E. railway generators. This was the first important application of electrical power transmission to textile manufacture.

In the Carolinas and Georgia are many valuable water-powers, and capital has been steadily invested in these powers during the last five or six years, and several notable electrical developments have been made.

The Pelzer Manufacturing Company, at Pelzer, S. C., one of the largest manufacturers of cotton goods in the South, has a well-equipped electric-power plant. The transmission plant consists of three pairs of 60-inch turbines, direct-connected to three 750 kilowatt 3-phase G. E. generators, wound for 3,300 volts. The power is carried three miles to the mills. The motors consist of one 400 horse-power synchronous motor, wound for high potential, fifteen 110 horse-power, four 75 horse-power, two 50 horse-power, one 20 horse-power, and four 5 horse-power, a total of 2,530 horse-power. Most of these motors are of the inverted type, and are suspended from the ceiling, and receive current at low potential from step-down transformers, located in the substation at the mills. The mills are lighted by 1,200 incandescent lamps, from the same power.

The electric plant of the Columbia Mills Company, of Columbia, S. C., also deserves notice. Two pairs of 48-inch horizontal turbines, operated under 26 feet head of water, develop 2,000 horse-power. One 24-inch wheel under the same head develops 190 horse-power, making a total of 2,190 horse-power. This power drives two 500 kilowatt 3-phase generators, direct-connected to the turbines, running at a speed of 108 revolutions per minute. The power is transmitted a distance of one-eighth mile to the mills, and there drives 1,775 horse-power of inverted motors, and these motors operate all of the machinery of the cotton mills.

These two plants illustrate better than words the advantages derived from the electrical development of water-powers, especially when the powers are utilized for manufacturing raw materials raised at the very doors of the mills. In the cases of these mills in particular, a large saving is made in the cost of power, and the use of individual ceiling motors dispenses with many feet of power-wasting shafting, and also saves a large amount of valuable floor space. The absence of many yards of belting gives better light to the employees in the building, and lessens their chances of being accidentally injured. Another point to be scored is the cheapness of living and the low cost of labor in the locality of these mills.

That this locality is a splendid field for the investor is shown in the interest taken by the Government in having all the water-powers in this section accurately measured. A very complete report has been published on "The Progress of Stream Measurements" by the U. S. Geological Survey. This publication very materially strengthens the views advanced a few years ago: that this section offers splendid opportunities for a water-power development company. Such a company could buy the best powers and develop them at leisure. The cost of such developments would be exceedingly reasonable, since timber for buildings and pole lines and stone for dams are to be found wherever there are powers. There are many other features worthy of consideration, such as the building of factories for manufacturing many articles that are now brought to this section from a distance. Land about the factories

would also be available for town sites, so that the original outlay would be gotten back in a few years.

There are nearly 500 water-power electric plants in the United States, representing an investment of over $60,000,000. The total horse-power represented by water-wheels is over 200,000. The power is furnished for lighting 28,000 arc lights, 845,000 incandescent lights and for operating about 60,000 horse-power of motors. There are over 610 miles of electric street railway operated by water-power electrically transmitted.

The geographical location of the plants shows that the water-powers have been electrically developed in proportion to the powers available. New England has no coal fields, but it seems that Providence has supplied this portion of the country with numerous large water-powers. Of the 312 plants from which there are reliable data, 115 are located in the States of Maine, New Hampshire, Vermont, Massachusetts and New York. Michigan has twenty-six, California, twenty-five, and Colorado, eleven. The other plants are distributed among the other States.

It seems to be fairly well established that it pays to develop water-powers from 50 horse-power and upward, and that additional steam-power is necessary when the water-power is not sufficient to do all the work, and is not reliable at all seasons of the year. It is a well-settled fact that at the present time power can be profitably transmitted up to 80 miles, and utilized for any purpose for which steam-power has been applied. In mining localities it has made possible the profitable reduction of low grade ores that could never have been mined had steam been the only power available, owing to the enormous cost of coal and the difficulty of transporting it from the nearest point on railroads to the mines. In short, we find that our inventors have produced water-wheels, dynamos, motors and transformers of the highest efficiency, that governors regulate the water-wheels with the greatest precision, that insulators are made to safely carry currents of enormously high potentials, and that perfect protection is afforded the electrical apparatus from electrical disturbances caused by lightning.

Not until all electric light and power stations are equipped with total-output wattmeters, and accurate books are kept, showing the exact amount of fuel used and all of the expenses of operating the plants, will satisfactory data be available for comparing the cost of producing current by the two methods—water and steam.

Microscopic Examination of Silk Moths.

The females are left with their eggs in this latter system until time for the microscopic examination, to which each moth is subjected, in order to determine if she is free from disease and whether her eggs are to be saved for the next year's hatching or destroyed at once.

This is a very tedious task, and in a large establishment requires some five or six months, commencing the last of June or early in July, depending upon the season. By this method there is no numbering of squares or figuring to confuse the peasants, and the process is simple, for the moth is taken from each bag, put into a little mortar with a teaspoonful of water, ground up, and a drop of this liquid placed on the glass plate of the microscope, and if small, black spots the shape of the cocoons are discovered the eggs of this moth are at once destroyed, for these little black microbes are a sure sign of disease. The males are not examined, as the health of the eggs depends entirely upon the female.

The eggs reserved for seed are kept, up to the time of their hatching, as described in the first part of this report, and it can be seen from the foregoing account that the process of rearing silkworms is a work of detail.

DYEING DEPARTMENT.

Dye Recipes for November.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16 page pamphlet, in convenient form for preservation. Subscription price for the TEXTILE WORLD with the Dyers' Supplement is $3.

Recipe No. 161.

Orange on Cotton Yarn.

Columbia Orange R on 100 lbs. of cotton yarn.

Prepare dye bath with

10 lbs. Glauber's Salt.
1 lb. Soda.
3 lbs. Columbia Orange R.
(Berlin Aniline Works, 72 Front St., New York.)

Enter yarn at 180 F., bring to a boil and boil one hour.

Columbia Orange R gives a rich shade between a reddish orange and reddish brown. It goes on the fibre evenly, and has high coloring power.

Recipe No. 162.

Blue on Cotton Yarn.

Diamine Azo Blue R on 100 lbs. cotton yarn.

Prepare dye bath with

30 lbs. Common Salt.
3 lbs. Diamine Azo Blue R.
(Wm. J. Matheson & Co., Ltd., 182 Front St., New York.)

Enter yarn at 170 F., bring to boil, boil one hour, take out and rinse.

Recipe No. 163.

Brown on Cotton Yarn.

Rhine Brown B on 100 lbs. cotton yarn.

Prepare the dye bath with

4 lbs. Rhine Brown B.
(O. S. Janney & Co., 8-10 Letitia St., Philadelphia, Pa.)
2 lbs. Sal Soda.
20 lbs. Common Salt.

Enter yarn at 160 F., turn while raising to the boil, and continue boiling for one hour, then wash and dry.

Subsequent lots require about 4-5 the above amount of dyestuff, to produce the same shade.

Rhine Brown B produces a rich shade of brown, possessing remarkable fastness, which is made faster by a subsequent treatment with

2% Bluestone

and

1% of chrome.

The dyed yarn, after being washed is worked for twenty minutes in the chrome and blue stone, at the boil, and then thoroughly washed. Treated in this way a brown is produced which is almost fast to light.

(See recipe 182, December, 1898, for a shade of brown from this dye. In recipe 158, October issue, may be seen a pleasing shade of yellow from Rhine Yellow.)

Recipe No. 164.

Black on Worsted Yarn.

Anthracene Chrome Black G B on 100 lbs. of worsted yarn.

Prepare dye bath with

5 lbs. Acetic Acid.
5 lbs. Anthracene Chrome Black G B.
(Wm. J. Matheson & Co., Ltd., 182 Front St., New York.)

Enter the yarn and work at a boil for ½ to ¾ of an hour.

Then lift the yarn, cool slightly by adding cold water, and add

7 to 8 lbs. Bisulphate of Soda

or

3 to 3½ lbs. of Sulphuric Acid.

Continue the boiling until the bath is exhausted, then add

1¼ to 1½ lbs. Bichromate of Potash

and boil ½ hour longer. Then wash and dry.

Anthracene Chrome Black G B produces black of a brownish tone, which

is extremely fast to washing, light, milling, steaming, alkalies and acids. It stands carbonizing, which renders it suitable for dyeing loose wool. It dyes evenly and its penetration is excellent, thus rendering it valuable in the dyeing of heavy goods and felts. (See recipes 116, 135 and 157 for other blacks from other brands of this dye.)

Recipe No. 165.

Blue on Cotton Yarn.

Brilliant Direct Navy Blue R on 100 lbs. cotton yarn.

Prepare dye bath with

25 lbs. Glauber's Salt.
2½ lbs. Brilliant Direct Navy Blue R.
(C. Bischoff & Co., 87 Park Place, New York.)

Enter yarn at 180 F., bring to a boil and dye at this temperature for at least one hour.

Brilliant Direct Navy Blue R goes on the fibre slowly and evenly and has good penetrating power. (See recipe 149, October issue.)

Recipe No. 166.

Yellow on Worsted Carpet Yarn.

Chrysoline on 100 lbs. of worsted carpet yarn.

Prepare dye bath with

4 lbs. Sulphuric Acid.
20 lbs. Glauber's Salt.
1 lb. Chrysoline.
(John J. Keller & Co., 104-106 Murray St., New York.)

Enter yarn at 140 F., bring slowly to a boil and dye at this temperature for one hour.

Chrysoline is a new acid dyestuff of a greenish cast, very fast to washing and fulling. It dyes very evenly and is a valuable product for combination with other dyes.

Recipe No. 167.

Blue on Cotton Yarn.

Dark Blue 4 B Extra on 100 lbs. of cotton yarn.

Prepare the dye bath with

25 lbs. Common Salt.
3 lbs. Dark Blue 4 B Extra.
(New York & Boston Dyewood Co., 55 Beekman St., New York.)

Enter yarn at 180 F., bring to a boil, and dye at this temperature for at least one hour.

Dark Blue 4 B Extra gives a very even and brilliant shade of blue on cotton.

Recipe No. 168.

Red on Cotton Cloth.

Direct Bordeaux on 100 lbs. of cotton cloth.

Prepare dye bath with

20 lbs. Common Salt.
3 lbs. Direct Bordeaux.
(The Stone & Ware Co., 157 Maiden Lane, New York.)

Introduce the material at a temperature of 180-190 F., bring to a boil and boil for at least one hour with constant working. As with other direct cotton colors, the dye bath should be kept of as small volume as possible.

The quantities given above are for the first bath. If the bath is to be used again the quantity of dyestuff may be diminished considerably.

Direct Bordeaux has a high coloring power and is fast to alkalies.

Recipe No. 169.

Brown on Cotton Yarn.

Compound shade on 100 lbs. of cotton yarn.

Prepare dye bath with

5 lbs. Sal Soda.
25 lbs. Common Salt.
2 lbs. Thiocatechine No. 1.
3 lbs. Cachou de Laval.
½ lb. Vidal Black Mercaptol.
(Sykes & Street, 85 Water St., New York.)

Enter yarn at 180 F., bring to boil and dye at this temperature for at least one hour, with sufficient working to insure evenness.

Then fix in bath of

2½ lbs. Potassium Bichromate.
2½ lbs. Copper Sulphate.
5 lbs. Sulphuric Acid.

At about 140 F., for 20 minutes. The shade obtained will be very fast to light, air, acid and soaping. (See recipe 144, Sept. issue, for the same combination in different proportions, also recipes 115 and 153, August and October, respectively, for other interesting combinations.)

Recipe No. 170.

Green on Cotton Yarn.

Direct Green Y Y on 100 lbs. of cotton yarn.

Prepare dye bath with

25 lbs. Common Salt.
3 lbs. Direct Green Y Y.

(New York & Boston Dyewood Co., 55 Beekman St., New York.)

Enter yarn at 180 F., bring to a boil and dye at this temperature for at least one hour.

Direct Green Y Y gives a pleasing and even shade of green on cotton.

Recipe No. 171.

Carmine Red on Worsted Yarn.

Guinea Carmine B, on 100 lbs. of worsted yarn.

Prepare dye bath with

4 lbs. Sulphuric Acid.
20 lbs. Glauber's Salt.
1½ lbs. Guinea Carmine B.

(Berlin Aniline Works, 72 Front St., New York.)

Enter yarn at 140 F., bring slowly to a boil and dye at this temperature for at least one hour.

Guinea Carmine B yields very level shades, is fast to alkalies, stoving, and very fast to light.

Recipe No. 172.

Very Dark Blue on Cloth.

The Amend mordanting process on 100 pounds woolen cloth.

(Controlled by the Amend Process Co., 205-211 Third Ave., New York.)

Prepare bath for mordanting with

6 lbs. Acetic Acid, 30%.

Turn one-half hour at 140°.

Then add to same bath a solution of

1 lb. Chromic Acid, previously dissolved in water.

Turn one-half hour, and let temperature drop.

Add to bath

6 lbs. Bisulphite of Soda.

Bring temperature up to 140°, while turning, and turn one-half hour at that heat. Rinse off.

Dye in a bath of

6 lbs. Hematine No. 1.

(Stamford Mfg. Co., 133 Front St., New York.)

By this system it does not take so long to mordant or dye, as according to the old way of mordanting with bichromate of potash and tartar. The yarn is left in a very much better state, as it requires no heat, to speak of, in the mordanting, thus saving steam. Also, the yarn, cloth, or stock can be handled much easier and quicker. Brighter shades are produced than if mordanted in the old way. It also saves in dyestuffs, and dyes deeper and faster colors, both to light and soaping. The dye is also assisted in working on the fibre more level.

Recipe No. 173.

Blue on Worsted Yarn.

Chromozone Blue R on 100 lbs. of worsted yarn.

Prepare the dye bath with

4 lbs. Sulphuric Acid.
20 lbs. Glauber's Salt.
3 lbs. Chromozone Blue R.

(John J. Keller & Co., 104-106 Murray St., New York.)

Enter yarn at 140 F., bring slowly to a boil, and dye at this temperature for at least one hour.

Chromozone Blue R is an entirely new acid dyestuff. It goes on the fibre slowly, thus ensuring evenness and thorough penetration. (See recipe 140, September, for a blue from Chromozone Blue B.)

Recipe No. 174.

Orange on Cotton Yarn.

Pluto Orange G on cotton yarn.
Prepare dye bath with

10 lbs. Glauber's Salt.
1 lb. Soda Ash.
3 lbs. Pluto Orange G.
(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)

Enter yarn at 180 F., bring to a boil and dye at this temperature for one hour.

Pluto Orange G is fairly fast to light and washing. It can be applied to mixed goods, and is suitable for padding and for top-dyeing goods printed with aniline black.

Recipe No. 175.

Drab on Cotton Yarn.

Cachou Brown T on 100 lbs. cotton yarn.
Prepare dye bath with

2 lbs. Soda Ash.
50 lbs. Common Salt.
1 lb. Cachou Brown T.
(Sykes & Street, 85 Water St., New York.)

Enter yarn at 180 F., bring to boil, and dye at this temperature for at least one hour.

Cachou Brown T belongs to the Cachou de Laval-Thiocatechine group, but requires no fixing bath. It gives a shade fast to light, air and soap. If the bath is used over again, the amount of salt is reduced one-third, while the amount of soda ash remains the same.

Recipe No. 176.

Yellow on Cotton Yarn.

Chloramine Yellow G G on 100 lbs. cotton yarn.
Prepare the dye bath with

15 lbs. Glauber's Salt.
2 lbs. Chloramine Yellow G G.
(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)

Enter yarn at 180 F., bring to a boil and dye at this temperature for one hour.

Chloramine Yellow G G is extremely fast to alkalies, acids, chlorine, heat, etc. It can be used in the dyeing of mixed goods, and for padding cotton cloth for subsequent printing.

Correction.

In the setting up of our forms, in our composition room,—recipes 159 and 160, pages 90 and 100, in our October issue,—matter that was intended for one was incorporated in the other, which necessitates their reproduction, corrected, as below:

Recipe No. 159.

Blue on Cotton Yarn.

Diphenyl Blue B M on 100 pounds of cotton yarn.
Prepare dye bath with

3 lbs. Diphenyl Blue B M.
(John J. Keller & Co., 104-106 Murray St., New York.)
20 lbs. Common Salt.

Enter yarn at 180°, bring to boil, and dye at this temperature for at least one hour, with sufficient stirring to insure evenness.

Diphenyl Blue B M goes on the fibre evenly, and produces a bright, handsome shade of blue.

Recipe No. 160.

Garnet on Worsted Yarn.

The Amend Mordanting Process (controlled by The Amend Process Co., 205-211 Third Ave., N. Y.) on 100 pounds worsted yarn.
Prepare bath for mordanting with

6 lbs. of Acetic Acid (30 per cent.).

Turn one-half hour at 140° F. Lift yarn and add

1 lb. of Chromic Acid (previously dissolved in water).

Turn for one-half hour, allowing temperature to fall.
Then lift and add to bath

6 lbs. of Bi-Sulphite of Soda.

Bring bath to 140° F. and turn for one-half hour at this temperature.
Wring or pass through hydro-extractor, and dye in a bath of

12 lbs. Alizarine Garnet.
(Wm. Pickhardt & Kuttroff, 128 Duane St., New York.)

½ lb. 20% Ammonia.

Enter goods at ordinary temperature, gradually raising same to boiling, and finish the dyeing at this temperature.

The advantages of "Amend Mordanting Process" over the old method of mordanting with bichromate of potash and tartar or lactic acid are:

(1) But little heat is required, hence a great saving in steam.

(2) The process is shorter.

(3) The mordanted yarn is left in a better condition, since the boiling temperature of the older mordanting process is avoided.

(4) There is a saving in the dyestuff, i. e., the same depth of shade with a greater brilliancy can be produced with a lower percentage of dyestuff.

(5) The dyed goods are less liable to unevenness by this process than the old.

New Dyes.

We have been presenting some very handsome colors in our Dyers' Supplement this year, and we continue them in this number, as noted below.

A very handsome orange on cotton yarn is seen in recipe 161, obtained from the use of Columbia Orange R, furnished by the Berlin Aniline Works, New York. This dye is recommended chiefly on account of its great intensity, combined with its low cost. It is a substantive color, used on cotton, the shade lying about half way between Congo Orange and Congo Brown, and is best dyed like the latter, with the addition of Glauber's Salt and a little soap or acid, though when the latter ingredient is used, an excess must be avoided. The dyeings are only slightly reddened by acids and alkalies. It is not fast to bleaching, but its fastness to calendering is very good. When used on union goods, the wool is dyed redder and fuller than the cotton. It may, however, come into consideration for cheap goods. This same house show their Guinea Carmine B in recipe 171, for the production of a carmine red on worsted yarn. This is a new red acid dye for wool, and it is especially suited for shading processes, distinguished by its level dyeing properties, purity and brilliancy of shade, fastness to alkalies, and extreme resistance against light.

Recipe 162 shows a blue on cotton yarn, produced by the use of Diamine Azo Blue R, supplied by Wm. J. Matheson & Company, New York. We would suggest dyers sending for the color card concerning this dye, which will be sent upon application to this company. This same house show in recipe 164 their Anthracene Chrome Black G B, for the production of a black on worsted yarn. This is a favorite brand of dyestuff used in the dyehouse, as having met with great success for fast wool dyeing.

John J. Keller & Company, New York, show their Chrysoline in recipe 166 for a yellow on worsted carpet yarn. This product dyes wool very level and gives fast shades, being an exceedingly good combination color.

Direct Bordeaux, shown in recipe 168, for a red on cotton yarn, comes from the Stone & Ware Company, New York. This dye is adapted especially for cotton, and has the advantage of giving a bright, full shade, as well as being very fast.

A very attractive shade of orange on cotton yarn is seen in recipe 174, from Pluto Orange G, furnished by Farbenfabriken of Elberfeld Company, New York. This is a new color, and produces shades of orange from a delicate green to the brightest orange, and its fastness to light is good. It is especially adapted for dyeing cotton, half silk and silk, as the shades on these fibres are fast to washing. When dyed on silk, its fastness to water is also good. It can be used in conjunction with other dyestuffs, suitable for one-half wool. As stated in our dyer's comments, it is suited for padding purposes, and for top dyeing goods printed with aniline black. This house also furnishes in recipe 176 a new dye under the name of Chlora-

mine Yellow G G, for the production of a yellow on cotton yarn. This is a new benzidine dyestuff, possessing remarkable properties. It dissolves easily and levels well, besides being extremely fast to alkalies and acids, chlorine, etc. It yields a pure tone, and is especially adapted for dyeing loose yarns, hosiery, piece goods, etc., in vats, machines or other apparatus. It is also suited for the dyeing of one-half wool and one-half silk.

Sykes & Street, New York, furnish in recipe 175, for the production of a drab on cotton yarn, their Cachou Brown T. While fixing is not essential, the product is increased in fastness to light, air, soap and acid by passing through a fixing bath after dyeing and washing well, of three per cent. Bichromate of Potash and one per cent. of sulphuric acid, cold. A more economical result can be obtained by passing through a bath of iron liquor, cold, two degrees Be., or the product may be fixed with blue vitriol and sulphuric acid, in the same manner as Cachou de Laval, etc.

Making Dyes.

COTTON SEED OIL.

When crude cotton-seed oil is refined by means of weak alkaline solutions, the solutions after separation from the oil contain, among other matters, a substance which, after a series of crystallizations from glacial acetic acid and from alcohol, can be obtained as yellow crystals, easily soluble in alcohol, ether, and boiling acetic acid, not soluble in water and easily soluble in alkalies. This substance may be isolated from other matters contained in the above solutions by treatment which consists, essentially, in submitting the solutions to fractional precipitation with earthy salts like calcium chloride, ($CaCl_2$) which convert the fatty acids contained in the said solutions into insoluble or not easily soluble soaps. The residual liquor is then treated with an acid, such as hydrochloric acid, which will decompose alkaline carbonates and the like as well as the alkaline compound of the coloring-matter.

A process for accomplishing this has been the subject of a patent. The color-precipitate may be treated to give useful coloring-matter, as follows:

First. Take twenty parts of the color-precipitate and dissolve it in a solution of about fifteen parts of NaOH in three hundred parts of water and pass through this a current of air for several hours. The original brown solution gradually becomes brown violet and at the same time a coloring-matter is produced which possesses marked affinity for mordanted fibres. From time to time samples of the solution are drawn and used for dyeing small weighed specimens of mordanted wool or cotton, and as soon as it is found that the maximum of coloring-matter is produced the air current must be stopped and the alkaline solution acidified, thereby precipitating the coloring-matter, which may then be employed for dyeing in the usual manner. Instead of NaOH the corresponding quantity of KOH or alkaline carbonates may be used, and instead of passing a current of air through the alkaline solution the said alkaline solution may be agitated by agitators in the presence of air.

Second. Ten parts of the color-precipitate are heated with from fifty to one hundred parts of crystallized sodium sulphide, with the addition of or without sulphur. The heat is maintained for a short time at about 120° centigrade and is then raised to about 250° centigrade for several hours. There is produced a coloring-matter which dyes unmordanted cotton shades of brown. It may be used direct in the crude state for dyeing or it may be precipitated from its solution in sodium sulphide with acids and afterward redissolved in sodium sulphide. The shades can be fixed by passing the dyed goods through solutions of metallic salts—such as cop-

per sulphate, bichromate of potassium, and the like.

Instead of flocculent precipitate the product described under the first head or an oxidation product of the latter may be used or the calcium soap obtained during the above-mentioned process for obtaining the color-precipitate and which contains a quantity of the coloring-matter of the cotton-seed oil.

The coloring-matter can be used also for printing cotton.

The process is effected as follows: The goods are impregnated in an apparatus suitable for the purpose with a solution of the coloring-matter to be used mixed with an alkaline medium, such as ammonia, hydroxids and carbonates of alkalies, carbonate of ammonia, alkaline reagent salts, such as phosphate of soda, borax, silicate of potash, aluminate of sodium, alkaline reagent soaps, Turkey red oil and organic bases, (for instance, amins). The volatile mediums employed have the advantage over the fixed alkalies and those containing salts that in the drying they evaporate and leave the coloring-matter insoluble on the fibre in such a manner as to thoroughly impregnate the fibre, whereas when fixed alkalies are employed it remains soluble. Besides the solution of coloring-matter there may be added to the dye-bath substances which do not precipitate the coloring-matter in an alkaline solution—as, for example, aluminate or stannate of sodium, solution of oxide of zinc, etc. After impregnating the fibre the excess of liquid is removed by centrifugal machine or otherwise. In some cases it is advantageous and in other cases (for cops, spools, etc.) it is necessary to dry the material for fixing purposes. A short steaming will have the same effect. The material is then impregnated with the mordant in a bath containing the necessary mordants, (alumina, chrome, lime, iron, etc.), best in the shape of weak or easily-volatile acids, such as acetic acid. The excess of mordant is removed and after or without drying the formation of the color-lake can then be effected and completed by steaming. Washing, soaping, and clearing serve in many cases to increase the brightness of the dye.

The Trade Position of Indigo.

The indigo market for the first half of the current year has been characterized by great firmness, the tendency in the price having been, and is now, upward, due chiefly to the strong statistical position of the article. At the July auction in London, stocks showed a decrease of 7,410 chests, of 130 to 140 kilos, as compared with last year's stock at the same time. This was a very large decrease, considering that the total stocks in 1898 amounted to only 21,607 chests. It is thought that the stocks in the hands of middlemen are almost entirely exhausted. The extent of the present crop of East Indian indigo cannot be given at this time, but it is estimated that it will not exceed 83,000 maunds. This is a falling off from last year's crop of nearly 25 per cent., and shows a very much larger percentage of decrease as compared with any of the other preceding five seasons. In fact, the estimated crop for the present season is less than anything in the history of the indigo trade. There is no doubt that the consumptive demand for indigo will be as large this season as at any time heretofore, and the consequence will be that the deficiency will have to be supplied by synthetic indigo, which is rapidly coming into popular estimation.

The British Consul-General in Germany, in a recent report on the chemical trade of that country, makes the following interesting statement concerning the progress made in the manufacture of indigo, synthetically: "Among new manufactures the manufacture of artificial indigo is decidedly the most important. The most sanguine anticipations of the manufacturers have been realized. The favorable

practical results of the new manufacture have convinced the consumers of the great advantages which it possesses, and all doubts as to its equality with the natural product have disappeared. In fact, artificial indigo is a perfect substitute for the natural product. This has, of course, led to the establishment of numerous factories for its production; this fact, together with the low price of the natural indigo, will eventually cause some difficulties in the trade."

Considering the position in which the indigo market finds itself, it is fortunate for the consumers of indigo that the present tariff law admits of the importation of synthetic indigo at the same rate of duty as vegetable indigo. Were it otherwise, the users of indigo among manufacturers would find themselves in a very uncomfortable position.

Dyeing Wool Slubbing.

For certain purposes the dyeing of cotton in the sliver and of wool in the slubbing gives superior results. Otherwise it would probably not be done, as although it certainly is easier than cop dyeing, it is more difficult than dyeing in any other stage of manufacture—that is to say, as far as the actual tinctorial treatment is concerned—for it has its advantages otherwise in saving work.

Sliver and slubbing are produced at a certain stage of spinning, where the fibres have been carded out straight, but before any twist has been put into the long narrow ribbon. They are both treated very much alike, but our remarks apply to slubbing alone. It comes to the dyer in the form of balls (or "tops"), the amount of material balled being regulated simply by convenience, but rarely exceeding a weight of 10 pounds. The dyer reels the slubbing and cuts it into reel lengths of one yard each, tying the ends together with string in such a way that it resembles a hank of yarn. It is evident, therefore, at the outset that slubbing dyeing is very similar to hank dyeing; but there is a difference, for the comparatively rough treatment that hanks are submitted to would ruin tender slubbing.

Now let us get at the reasons for slubbing dyeing. It may be looked upon as a loose wool in a rather more difficult state to work, so the question at once arises—Why not dye the fibres in the loose wool to get the same results? It takes more dyestuff to produce a given shade on loose wool or slubbing than on yarn or cloth, and this amounts to the same thing as saying that, fibre by fibre, the loose wool or slubbing is more perfectly dyed. But the preference in certain cases to slubbing instead of loose wool dyeing is because it is impossible to avoid lumps forming in the stuff in dyeing loose wool with a machine, which, however carefully done, and with the best of machines, undoubtedly hurts the fibre. It is evident, therefore, that we get all the advantages and none of the disadvantages of loose wool dyeing in treating slubbing. The process, however, has disadvantages of its own.

Slubbing dyeing has also an advantage over the treatment of the stuff in the spun state, as it avoids dividing and rewinding the yarn. These advantages, together with the fact that the fibre is more perfectly dyed and less injured than in any other way, make it a favorite means of getting excellent results, and, therefore, it is chosen very generally in worsted manufacture. Dyed in this form in a dozen standard colors or so, any shade can be produced by mixing the colors for worsted yarns. It can also be produced in any shade simply by mixing a black dyed slubbing and an undyed slubbing together in varying proportions. As regards fastness to light of the final product, this method of procedure, it is asserted, gives very superior results. Many effects in figured and fancy designs (other than printed) can only be got by dyeing in the slubbing, and it is used even in well-advised preference in the manufacture of certain plain cloths.—Exchange.

QUESTIONS AND ANSWERS

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especi lly invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

To Prevent Splitting of Laps.

Editor Textile World:

Can you give me any information how to prevent split laps, or lick laps? I have tried all ways to prevent this, but I can find only one way to do it, and that is to reduce the speed of the fans, but then there is more or less waste. If the fans could be speeded up to 1050 revolutions per minute, instead of 630, I think I could obtain better work. If you know of any way to prevent the trouble, I should like to hear from you.

J. L.

We do not think that our correspondent states his trouble fully enough for us to give him advice that would be of much value to him. If we should attempt to say anything, we would suggest that he put a sheet-iron adjustable door over the opening from the cage cylinders to fan, made so that they can be moved to such a point that the laps shall stop splitting. This acts the same as a cut-off in the old-style pickers, whose laps never split. There is another thing that causes split laps, and that is the dust room not being large enough to take away the air from the fans, which make a back draft. We would also suggest taking some smooth, strong paper and cover the top cage cylinder with it, thus throwing all the cotton on to the bottom cylinder, and if these are tried he will find out one that will do him good.

Books on Dyeing.

Editor Textile World:

I have been referred to you as the best authority for recommending proper books for dyers' use. I should like to get a book on the coloring of fast black, also one how to dye plumes and curl the same.

J. H. R.

We would suggest for recipes and the proper dyes for coloring black, that our advertisers be addressed for some of their color cards relating to this color, or any other. Our inquirer will get something nearer to his needs by this means than from any books. We would suggest that he secure a copy of a work entitled "A Handbook of Garment and Dyeing Cleaning," by George H. Hurst, published by J. B. Lippincott & Company, Philadelphia.

Cotton Gin.

Editor Textile World:

I should like the names of some makers of roller gins, English, German, French and American.

J. T. F.

There are not many makers of cotton gins of this description, though there are a number of these gins that have been patented, and one or two constructed, for the purpose of interesting capital in their manufacture. We know of no roller gins that can be obtained in any quantity, except one or two, and about these we have written our inquirer.

Book on Woolen and Worsted Manufacture.

Editor Textile World:

I wish to obtain a good book on woolen and worsted manufacture. Can you recommend such a one?

G. H.

We would suggest purchasing the lately published edition of "Wool Manufacture," by Roberts Beaumont. Price $3.

Jaeger Yarn.

Editor Textile World:

Can you tell me the colors of the cotton mixture as represented in the accompanying yarn; also the proportion of each used? Is it usually mixed in the picker, or on the card?

F. F. A.

We cannot give the colors of the mixture any better than your own eyes will tell you. As to the proportion of the different colors, it would be difficult for us to tell, and we would suggest making experimental mixtures, which need not be large until the right combination is obtained. We should say, as a rough guess, that the mixture of the sample of yarn sent us was 5 per cent. and 95 per cent. The mixture is usually done in the picker.

Gloss Finish.

Editor Textile World:

I send you a sample towel with a silver gloss finish, which I desire to reproduce. Can you tell me how it is done?

T. H.

The towel that we have received is linen warp and cotton filling. We cannot state exactly how the gloss finish is obtained in this instance. There are machines for producing this effect, known as the glazing or lustreing operation. The lustre also can be obtained by passing the goods through calenders, in which the greater the pressure, the greater the glaze, and with heated metal bowls still more brilliancy is obtained; the heat of the bowl drying the tissue gives it a feel and smarter appearance. It is thought advisable, in many cases, to slightly dampen the goods before calendering; for glazing it requires more dampening than for simply finishing. We would suggest our correspondent securing the following work, as it contains much that we think would be of value to him in his vocation: "Elementary Treatise on Finishing White Dyed and Printed Cotton Goods," by Joseph Depierre. It is a work that was published in 1889, at Manchester, Eng., but it cannot be considered, by any means, out of date.

Oxidized Black on Hosiery.

Editor Textile World:

What kind of dyestuffs, and a recipe for using the same, should I use to get oxidized black on cotton hosiery?

D. O. N.

We have replied my mail. The question asked is not one readily answered in a few words. Besides, it is too general. The dyeing of oxidized aniline black is extremely difficult, and oftentimes results in the production of a great many seconds and inferior goods, unless one is thoroughly familiar with the process. It is, therefore, almost impossible for one to give any definite information, especially when the goods to be dyed are not fully known. In order to give a satisfactory answer, the dyeing apparatus with which the dyer is to work should be known.

Ramie.

Editor Textile World:

We frequently receive inquiries in regard to the ramie industry. We have noticed that this fibre is not included in any market quotations. Have you any definite information in regard to the importation, at the present time, of this material, or its use for manufacturing purposes in this country?

L. H. D.

It would be difficult, if not almost impossible, to make market quotations for this fibre, as there is little or no sale for it, and its manufacture is limited to an extremely small amount. We do not think that it is purchased to any appreciable extent in this country in its raw state, or in its prepared state, other than in the form of yarn, which is imported. There are no separate statistics showing the importation of ramie in any of its forms, that we know of, and if any exist they are known only to custom house officials, or to the Chief of the Bureau of Statistics, Treasury Department, Washington. Possibly these officials, were they addressed, could throw some light upon the amount of ramie imported. Thus far, manufacturers have not found it advantageous to use ramie in competition with other fibres.

Book on Sizing.

Editor Textile World:

Do you know of any book that treats on sizing of yarn or goods? I have an English book, but it treats on flour and China Clay size, which is not used in this country.

L. W. J.

The best book that we know of on this subject is "Size Ingredients, Size Mixing and Sizing," by Hugh Monie, Jr. Price $1. This book is intended to be a complete practical work, dealing with everything relating to the modern processes of sizing, etc. See our list of textile books.

Shaker Socks.

Editor Textile World:

Will you please inform one of your far away subscribers upon what machines the "Shaker Socks" are made. Your Directory for 1899 has recently reached me and I find much that is of great value in it and also in the Textile World.

Swatow, China. A. T.

We believe the old style "Shaker Sock" has gone out of the market almost entirely in this country, being replaced by a sock of about the same weight, with a seamless foot and a full ribbed leg. By consulting the advertising columns of the Textile World, you will find builders of this class of machinery who would doubtless be willing to send circulars and samples.

Honey-Comb Shawls.

Editor Textile World:

Will you give me a list of the manufacturers of worsted honey-comb shawls that are to be found in Massachusetts and Pennsylvania?

A. N.

We would suggest that the Textile World Directory be consulted, which will give all the needed information, we think.

New Publications.

The History of the Presidency. By Edward Stanwood. Boston and New York: Houghton, Mifflin & Company. This is a book of 586 pages, and is written by one thoroughly familiar with this subject, which is presented in a most attractive and instructive manner for popular reading. The basis of this book is the History of the Presidential Election, originally published in 1884, which has always been regarded as a standard. Increasing abundance of material and greater familiarity with the political history of more recent times caused a broadening of the first plan in subsequent editions, issued in 1888, 1892, 1896, and the present one, though the latter is under a new title, because of its greater scope than it had in its first form. The author has collected and presented all important matters relating to the presidency, beginning with the constitutional history of the office, covering every public event and discussion which had a perceptible influence in determining who should hold the office, etc. It is a book that should be easily accessible to every American citizen, who desires to be familiar with the politics of his country.

The Empire of the South, which is being distributed by the Southern Railway, is beyond question the most exquisite publication ever issued by a railroad company. It is 9 by 11 in size and contains nearly two hundred pages and four hundred illustrations. It gives in most entertaining form a complete record of the wonderful industrial growth of the Southern States, and also presents its charms as a resort section. The work cost upward of $20,000 to produce, and has been highly praised by the press both North and South. A copy will be sent prepaid to any one remitting 15 cents to G. C. Daniels, N. E. P. A., 228 Washington St., Boston.

Shoddy. The F. Muhlhauser Company, Cleveland, Ohio, are sending to the trade a very handsomely gotten up card, showing samples of some of their shoddy products in the loose state, and as made into yarn. The samples show a very handsomely prepared grade of shoddy and most excellent yarn made therefrom. This card will be sent to anyone upon application.

Political Science Quarterly for September. Boston: Ginn & Company. This quarterly appears with a number of timely articles, as indicated by the following: Paine's Political Theories; Anarchistic Crimes; Bismarck's Apprenticeship; Government Loans to Farmers; City and Country Taxes; Paul Deschanel; American Civil Church Law. This quarterly is edited by the faculty of Political Science of Columbia University, New York, and is devoted to the historical, statistical and comparative study of politics, economics and public law.

Blowers and Exhausters. Catalogue No. 100. This is a trade catalogue issued by the B. F. Sturtevant Company, Boston, Mass., illustrative and descriptive of their blowers and exhausters. Only the standard forms of construction of the "Monogram" type of Sturtevant fans are described, though some reference is made to a few special types for specific application. This type of fan is an adjunct of much importance to many manufacturing processes. It can be used either as a blower or exhauster. Those interested in such machinery should write for the catalogue.

Wool Blue N Extra. This is the title of a color card issued by Farbenfabriken of Elberfeld Company, with directions.

Benzo Nitrol Colors. This is a color card published by Farbenfabriken of Elberfeld Company, showing these colors on loose cotton, with directions how to use them.

Wm. J. Matheson & Co., New York, have just issued color cards and information relating to the following dyes sold by them: Immedial Black, for dyeing fast black warps for union goods; Diamineral Blue R, used on cotton piece goods; Shot Effects with Anthracene Acid Black S T, upon wool and silk goods. Some very interesting effects are produced by these dyes.

The Buffalo Forge Company, Buffalo, N. Y., have just issued a very attractive pamphlet relating to the engines of their manufacture, of the horizontal, centre and side crank types; uprights; and marines. The designs of these engines are very handsome. Users of steam engines would find it to their advantage to write to the publishers of this pamphlet for a copy of the same.

Practical Mechanics for Textile Workers. By George R. Smith, Manchester, Eng.: John Heywood. 235 pages. This is a most valuable work on mechanics, pertaining to textile factories, that has been published in recent years. In fact, it is the only one that we know of that covers the field in a way which can be practically useful to superintendents and overseers. It is written by the assistant lecturer and demonstrator in carding and spinning, Yorkshire College, Leeds. The book deals with measurements, which all mill men should be able to take accurately; with the units and apparatus employed in estimating heat, work and power; the disturbing influences in a machine which go towards making a machine what it is; cams, levers, pulleys; gears, shafting, belts; transmission of power; hydraulics; boilers, fuel, motive power, etc.

"It's All Right." This is the title of a pamphlet of 20 pages, issued by Joseph Dixon Crucible Company, Jersey City, N. J., relating to their flake graphite for cylinders and valves, which is represented as an ideal lubricant. The pamphlet is very attractively gotten up, with illustrations. A copy would be gladly sent to any applicant for it, by the publishers.

Cotton Movement and Fluctuations. New York: Latham, Alexander & Company. The twenty-fifth edition of this annual publication has just come to hand, in its usual attractive form. This has become a standard reference book, relating to the statistics of cotton. The principal article in this work is entitled "The Cotton Industry of Japan," written expressly for this edition, by the distinguished statistican, Thomas Ellison of

Liverpool. Illustrations and a description of the new Lowry cotton press also appears in this edition, relating to a mechanical system of baling cotton, which has now attracted much attention among planters and the trade. Besides the usual tables of receipts, stocks, exports, consumption, acreage, total visible supply and fluctuations, there is much interesting original matter that cannot be found elsewhere in such a concise form. This publication is not for sale, but is issued for gratuitous distribution among the friends and customers of the publishers.

Lanacyl Colors. This is the title of a sample card, issued by Wm. J. Matheson & Company, New York, showing gentlemen's suitings dyed with Lanacyl colors. We would suggest that dyers write for it.

Popular Science Monthly for October. New York: D. Appleton & Company. Price $5 per annum. In this issue appears an important article from Bishop Potter, on the charity question, in which he points out the degrading and demoralizing effects of receiving alms. Comptroller Coler has an article on the "Reforms of Public Charity," believing that much money can be saved to tax payers by a few judicious changes in the present system. The subject of Christian Science from a physician's standpoint is discussed. Prof. G. A. Dorsey furnishes an interesting illustrated account of the Hopi Indians, an isolated people, forming one of the most curious relics of ancient civilization which exists today in America.

Bulletin of the National Association of Wool Manufacturers. Edited by S. N. D. North, secretary of the association. The third number of Vol. 29 of this quarterly, devoted to the interests of the national wool industry, has just been issued. Its contents consist of the following subjects: Industrial Combinations in Textiles; The New England Wool Manufacture, by the secretary; Decisions of the Treasury Department on the Wool and Woolen Tariff.

Industrial News.

—Eugene F. Freund, formerly superintendent of the broad silk department of the Paterson Ribbon Company, Paterson, N. J., is on an extensive trip through the West, for the benefit of his health, and will be open for an engagement by the first of the coming year.

—Sykes & Street, dealers in anilines and alizarines, dyeing extracts and chemicals, have removed their Boston office to 165 High street.

—The Arkwright Mills, Spartanburg, S. C., have placed a repeat order for humidifiers with the American Moistening Company, Boston.

—The Berlin Iron Bridge Company, of East Berlin, Conn., have the contract for a bridge at West Seneca, N. Y. The bridge is 20 feet wide and 117 feet long. It is of the through riveted type of trusses, and has steel floor system.

—The Hargraves Mills, Fall River, Mass., have placed a repeat order for humidifiers with the American Moistening Company, Boston, Mass.

National Association Woolen and Worsted Overseers.

The seventeenth annual meeting of this association will be held at the United States Hotel in Boston on Wednesday, November 15th, at 10 a. m., for the annual election of officers and the discussion of other matters of importance, and it is expected that there will be a large attendance. The present officers of the company are the following: President, A. E. Jones of Webster; vice-president, Herman Amback of Providence; second vice-president, Thomas Brennan of Walnut Hill; third vice-president, Louis Cormac of Providence; treasurer, A. E. Jones of Uxbridge, Mass.; secretary, John Mulrooney of Plymouth. G. W. Burr of Lowell is the secretary of the beneficiary department.

—A very convincing little circular is that issued by the B. F. Sturtevant Co., of Boston, Mass., regarding their Exhaust Heads, which shows that by the utilization of centrifugal force in the operation of this head, the water is thrown outward with 1000 times the force exerted upon the steam, and is thereby absolutely separated from it.

—"Whirl round your head a closed vessel filled with wet steam. The water particles will be deposited on the farthest end. Why? Simply because water is heavier than steam, and is therefore thrown outward with 1000 times the centrifugal force." Thus is explained the reason for the effective operation of the Sturtevant Exhaust Head, as presented in a circular recently issued by the B. F. Sturtevant Co. of Boston, Mass. It will be sent upon application.

—The American Moistening Company have received an order for humidifiers from Messrs Bauer & Black, Chicago, Ill.

—The Berlin Iron Bridge Company, of East Berlin, Conn., are shipping to Mexico the structural iron material for the roof for a building 80 feet wide and 255 feet long. This roof is to be erected on masonry walls, and the building is to be used for a paper mill for the San Rafael Paper Company, City of Mexico. This is a duplicate of work furnished these parties something over a year ago.

—The B. F. Sturtevant Co. of Boston, Mass., have just issued a circular relating to their Exhaust Heads, which makes clear the efficiency of centrifugal force as a means of separating water and steam.

—The Bullard Machine Tool Company, of Bridgeport, Conn., have let the contract for a new blacksmith shop, 40 feet wide and 60 feet long. The side walls are of brick, and the roof trusses have a clear span and are made of steel. The Berlin Iron Bridge Company, of East Berlin, Conn., have the contract for the entire building.

—The Buffalo Forge Company, Buffalo, N. Y., have recently received a letter from the Engineering Department of the Peoria & Eastern Railway Company, Indianapolis, highly recommending their down draft forge shop equipment as being a complete success, and unsurpassed by any in the country.

—The Mandeville Cotton Mills, Carrollton, Ga., have placed an order for humidifiers with the American Moistening Company, Boston, Mass.

—C. E. Drew, of Cedartown, Ga., will, in the near future, put on the market a lace edging machine, which will make a variety of patterns at a very small cost. Ribbed underwear manufacturers will find this machine a great saving.

Cling-Surface.

Cling-Surface is a name becoming pretty well known in the manufacturing world, if inquiries and sales are an indication. The Cling-Surface Mfg. Co., of 199-205 Virginia St., Buffalo, N. Y., report that they have just established a branch in Johannesburg, South Africa, to meet the increased demand for Cling-Surface in that section from those who have been compelled to run their belts as tight as possible to prevent slipping. A recent letter from a prominent mechanical engineer says:

"Being somewhat skeptical as to the virtue of any belt dressing, it was some time before I concluded to try Cling-Surface, and only after being driven to it, as our belts were badly overloaded and showed signs of rapid depreciation. Your Cling-Surface was a complete revelation to me, and belts that formerly had to be run so tight as to cause a great deal of noise are now running slack and quiet, with not the least evidence of slipping.

I heartily recommend it for leather belting, for in addition to its increasing the pulling capacity of a belt, I find the belts are soft and show a fine glossy, yet very clinging surface."

—The Henri Nestle Company, manufacturers of Nestle's food, are establishing a large plant at Fulton, N. Y., for the production of their specialties in the United States. This firm has its headquarters at Vivay, Switzerland, and before establishing its plant in America, it has already constructed a similar plant in Sweden. The plant at Fulton, N. Y., will be fireproof, and of the most modern construction, using steel framework for the floors and roofs, with brick side walls, the floors being constructed of concrete supported by steel beams. The Berlin Iron Bridge Company, of East Berlin, Conn., furnished and erected all the steel structural work connected with this building, under the supervision of H. J. White, Consulting Engineer for Henri Nestle.

—At the New York exhibit of the Cling-Surface Manufacturing Co., Buffalo, N. Y., after running a month with two belts on double pulleys, the pulley face of the belt without "cling-surface" was beautifully polished. While the one with "cling-surface" was in the same condition as it was when first used; in fact, it was so evident that it was commented upon several times by sharp engineers, believing perhaps that the "cling-surface" pulley had been designedly roughened, but after they saw the running of the belts they were satisfied that it came as a natural result.

—The Modena Cotton Mills, Gastonia, N. C., have placed a repeat order for humidifiers with the American Moistening Company of Boston, the system to be installed in their No. 2 mill.

Are Your Pipes Covered?

Cold weather is coming on and the matter of pipe covering becomes of more importance every day. Here is a leakage in expense which can be stopped by comparatively small outlay, and not only is cost saved, but efficiency is gained at the same time. Of course it makes a good deal of difference what kind of coverings are used for steam pipes and boilers. The coverings made by the Norristown Pipe Covering Co., Ltd., of Norristown, Pa., have proved very satisfactory and are in extended use. They are adapted for any kind of service and are made in five different grades for different purposes. They can be conveniently put on, and the manufacturers assert that they will pay 100 per cent. of the money invested, besides giving dry steam wherever it is required.

Clutches.

New Haven, Conn.

The Eastern Machinery Co., City.

Gentlemen:—It may be of interest to you to know that we have run one of your Frisbie clutches for the past thirteen years, most of the time continuously during working hours. This clutch is apparently in as good condition as after the first week's service. We have been to no expense in the shape of repairs. We also have two other of your clutches, one connected directly with our main belt from the engine, which, in case of emergencies, we throw out, stopping the whole plant instead of shutting down the engine. It has worked perfectly satisfactory, and is in fine condition today.

Respectfully yours,

R. H. Brown & Co.

—The American Moistening Company, Boston, Mass., have a repeat order from the Globe Worsted Mills, Lawrence, Mass., for the equipment of their mills with humidifiers.

Business Brokers.

Attention is called to the advertisement of Riggs & Co., 575, 577 Bourse Bldg., Philadelphia, who conduct negotiations for the purchase and sale of business enterprises, negotiate partnerships, procure special capital, loans on corporations, organize stock companies, etc. The firm has been in business in Philadelphia since 1872, and has had dealings in all parts of the United States and Canada. They have negotiated the sale of many business propositions, and accomplished many difficult transactions which parties could not readily accomplish for themselves without undue publicity. Their long experience in the business and a record of nearly 30 years is evidence of their responsibility and efficiency. They make a specialty of this business as well as handling manufacturing properties, and solicit correspondence with those who have need of the services of skilled and confidential agents in such matters. F. D. Sterner is now the general manager and gives personal attention to the direction of the transactions in hand.

—The Berlin Iron Bridge Company, of East Berlin, Conn., are erecting in the village of Baldwinsville, N. Y., between the towns of Van Buren and Lysander, a plate girder bridge consisting of three spans of 85 feet each. The bridge has a roadway of 30 feet wide and two sidewalks of seven feet wide. The structure is

very substantial one throughout; the flooring is of buckle plate carrying concrete roadway. The bridge is also designed to carry a double track electric street railway track, besides the ordinary traffic.

—The Whitney Mfg. Co., Whitney, S. C., have placed an order with the American Moistening Company for the entire equipment of their mill with humidifiers.

"Half the Time and Less Power."

There is double the satisfaction in selling machinery when the builder learns that his customer is thoroughly satisfied with his investment and finds it all that it is claimed to be. It not only gives the pleasant feeling of having given good value for money received, but it is also an assurance of subsequent orders.

We think that A. Hun Berry, the ventilating wheel manufacturer, 23 West First street, Boston, has his full share of such experiences, as we very often come across well-satisfied customers of his who always send their order to him for another fan when occasion demands. Quite recently, the engineer in the mill of one of his new customers remarked, "We put on to the dryer (just equipped with a Berry wheel) one-third more wool than we did before and dry it in one-half the time and with much less power."

General Berry makes his wheels of the best material and workmanship that can be put in, and this, together with the meritorious design of the wheel and the good judgment shown in their installations when he or his well-known traveling man, Mr. Woodward, are allowed to plan them, is the reason of their success.

—The Spartan Mills, Spartanburg, S. C., have placed a repeat order with the American Moistening Company, Boston, Mass., for humidifiers.

George Woolford's Removal.

Geo. Woolford, manufacturer of cedar and cypress tanks, formerly of 2238-50 N. 9th St., Philadelphia, announces the completion of his new plant at Paschall, Philadelphia, and his removal thereto. Mr. Woolford has outgrown the capacity of his old plant, where he has been established a great many years and built up an extensive trade. Finding his accommodations inadequate for his growing business, he has erected one of the best equipped tank manufactories in the country, where ample room, abundance of material, new and improved machinery and the best shipping facilities will enable him to fill large or small orders at short notice. His new plant is now running day and night in order to keep up with his orders, and the prospects are that there is plenty of work ahead.

—The William Cramp & Sons Ship & Engine Building Co., of Philadelphia, Pennsylvania, will make extensive additions to their already large plant, and have placed the order for the new buildings with The Berlin Iron Bridge Company, of East Berlin, Conn. The new machine shop will be 142 feet wide and 350 feet long, three stories in height. All the floors, including the gallery floors, are to be controlled by electric traveling cranes. The framework will be of steel, the outside walls of brick, and will be one of the largest and most complete machine shops in the world.

Tests of Cling-Surface.

In our last June issue, we devoted considerable space to the report of Prof. R. C. Carpenter, on the tests made by him regarding the power efficiency of belts, and especially the results obtained by the use of Cling-Surface, on a slack belt. Since then, Prof. Carpenter has made other tests of the use of Cling-Surface, substantiating in every particular the statements made in his previous report. These tests, it appears, indicate, according to Prof. Carpenter, "higher efficiency of transmission and less loss of power in the case of belts treated with 'Cling-Surface' than in the case of belts not so treated, when working under the conditions prevailing at the time of the earlier test. This is due to the fact that the slipping of a belt causes considerable loss of power, the power so lost passing off in heat. The use of 'Cling-Surface' reduces the slipping and consequently reduces the loss of power occasioned by the use of belts that slip."

During the past six months Prof. Carpenter has had occasion to observe the practical use of "Cling-Surface" in a number of instances. "In all such cases," he says, "it has improved the belts by softening them, and as far as can be determined in the limited time (seven months) tends to preserve the leather of which they are constructed."

—The Berlin Iron Bridge Company, of East Berlin, Conn., have the contract for erecting at Yonkers, N. Y., a grand stand for the Empire City Trotting Club. The contract includes the complete stand. It will be a structure 100 feet wide and 400 feet long. Underneath the main seating deck will be located a restaurant, refreshment stands, lunch counters, and retiring rooms. Located some distance above the main seating deck are boxes suspended from the roof trusses, which adds very much to the desirability of the stand, and increases the seating capacity to a great extent. The structure will be fire-proof throughout; nothing combustible is to be used. The framework will be steel. Floors will be brick paving and concrete. The seating deck platform will be cement and concrete. The roof covering is to be corrugated iron. This stand will be one of the largest and best equipped structures of its kind ever built.

Wool Size.

This is a specialty of Bosson & Lane, 34 Central Wharf, Boston, and is designed for sizing woolen, worsted and carpet warps, and they claim it to be much superior to glue and similar sizing compounds. It has no disagreeable odor, dries quickly, is concentrated and economical. As a reminder of wool size, they are sending out a very attractive blotter of celluloid top, which will be an ornament to any manufacturer's or overseer's desk.

Lowell Textile School.

The Lowell Textile School has opened its fall term with a largely increased number of students, particularly of regular students.

C. C. Hedrick has resigned his position as instructor in cotton spinning to return to the Lowell Machine Shop, and his place has been filled by selection of Otis L. Humphrey.

M. W. McCarthy, instructor in woolen carding, and W. K. Denniston, instructor in hand looms, have left the school for other positions and their places have been filled by Arthur Stewart and A. J. Pradal, respectively.

C. B. Cluff, a graduate of the Massachusetts Institute of Technology, has been appointed instructor in general chemistry and quantitative analysis.

Capt. James G. Hill, for so many years connected with the Lawrence Corporation, is to give a course of lectures on mill engineering.

A dyeing department has been completed as was advertised in the catalogue and every facility is now offered for a most successful study of operations of industrial chemistry and textile dyeing.

—The American Ginning Company, operating the Prior Roller Gin, will erect a large ginning plant on the Mississippi River, in the vicinity of Greenville, Miss. Mr. Howard Sinn and Mr. Thos. W. Prior of the company have just left for that point.

—The Philadelphia Wool Scouring & Carbonizing Company has been organized under New Jersey laws, with the following officers: John Lunn, president, and Chas. Lunn, secretary and treasurer. They have located at 1818 Boston Ave., Kensington, and are now installing their machinery, expecting to be ready for business by Nov. 15th. The company will be fully equipped to scour and carbonize wool by a special system invented by Mr. Lunn, who will also act as manager of the plant.

Cling-Surface.

Elmira Knitting Mills, Elmira, N. Y. "On June 21st you sent us 25 lbs. Cling-Surface which we liked very much. We now ask for 50 lbs. more."

Elizabeth Mills, Hills Grove, R. I. "We are using Cling Surface and have had good results. We think it will prove to be the best of anything we have ever used on our belts."

British Hosiery Co., Thornton, R. I. "Cling-Surface has been entirely satisfactory. It is undoubtedly the best thing we ever used."

Standard Hosiery Co., Philadelphia, Pa. "Before we used Cling-Surface our belts were slipping and screeching heavily and would almost slip from pulleys. But two or three applications of Cling-Surface made a wonderful improvement. Our belts are running very slack, absolutely no slipping and have gained at least 25 per cent. of power."

Acheson, Harden & Co., Dundee, N. J. "Since using Cling-Surface our belts are running perfectly slack, doing away with all bother of keeping them tight to prevent slipping."

Galveston City Cotton Mills, Galveston City, Texas. "I have run my belts so slack they would not begin to drive and after applying Cling-Surface they have pulled the load and given higher speed on shaft than ever obtained before."

The Goulds Manufacturing Co.

The Goulds Manufacturing Company, Seneca Falls, New York, are to erect substantial brick buildings near them to be utilized for the manufacture of the immense power pumps which the company have been engaged in constructing for some years past. The plans for the new buildings show a machine shop 258 feet in length by 100 feet in width, boiler house 44 by 67 feet, a foundry 122 feet in depth by 85 feet in width, and a pattern warehouse 78 by 30 feet; also coke and sand sheds of suitable dimensions. The buildings will be one story in height, and supplied with all the latest improved machinery for handling great bodies of iron, and for the manufacture of large triplex pumps for water works, mining and other purposes. Side tracks from the Central railroad will be run around the buildings, and every facility provided for loading and unloading cars. The construction of the new buildings will materially add to the facilities for turning out more work. The buildings will cost from $50,000 to $60,000.

New Bedford Textile School.

The organization of the classes of the New Bedford Textile School, New Bedford, Mass., was completed last month, and the students enrolled.

The day classes are taught as follows: Yarn preparation and weaving classes by Thomas Yates, formerly of the Pierce Mills; the designing classes by Ernest Whitworth, a graduate of Yorkshire College, of Leeds, England; the cotton yarn preparation class by J. T. Broadbent, assistant principal of that department, formerly of the Lowell Textile School; the hand loom department by Samuel Holt, also formerly of the staff of the Lowell Textile School; the machine drawing and mechanism classes by F. E. Smith of New Bedford, formerly of the Mason Machine Works of Taunton, Mass.; and the steam engineering class by Gustaf Schantz, formerly one of the engineers of the Howland Mills of New Bedford.

The fifteen evening classes are taught by members of the day school staff, together with assistants whose services were engaged on account of their expert knowledge of the subjects to be taught.

The evening cotton yarn preparation class is under the direct charge of Managing Director Brooks, and in this department are 87 students, of whom 42 will take the cotton picking and carding course under J. O. Thompson, Jr., one of the superintendents of the Wamsutta Mills.

Twenty students have taken mule spinning under the tuition of Samuel Ross, Secretary of the National Association of Mule Spinners. Other classes have been formed in combing under Mark Creed of the Wamsutta Mills, and frame spinning under James T. Broadbent, assistant principal of the department.

Two large weaving classes have been formed, one in plain weaving, consisting of 32 students under Thomas Yates, principal of the weaving department of the Textile School, who is assisted by E. Spencer. Mr. Yates has also 33 students in fancy weaving and fixing, while Samuel Holt has taken the class on jacquard weaving and fixing.

The designing class is a very large one.

consisting of 44 students, and is taught by Ernest Whitworth, while the hand loom practice is in charge of Samuel Holt.

The mill arithmetic class is taught by W. H. Mitchell, who taught mill figures at the Y. M. C. A. last winter, and ought to be a popular class for those who desire to commence with simple textile arithmetic and prepare for later instruction in calculations on both yarn preparation, warp preparation and weaving machinery. It is possible to accommodate a few more students in this class.

The evening drawing school will be held this winter in the New Bedford Textile School under Principal George H. Nye, who will have charge of the first year's mechanical course. The second year's mechanical course will be in charge of E. E. Smith, and the architectural course will be taught by Oliver H. Gardner. A large class has been formed in free hand drawing under Miss Crabtree.

The total number of students in the combined classes, day and evening, is 275, which is very largely in excess of the expectations of the trustees, and is believed to be the largest number of students that has been enrolled in the first or any year of any American textile school. It is not possible to accept more applications for many of the classes as the rooms are occupied to their full capacity.

MILL NEWS.

Cotton.

New Mills.

—*Alabama, Gadsden. R. R. Asberry of Greenville, S. C., has purchased 1280 acres of land and riparian rights at lock No. 3, near this place, paying $27,000. He intends to develop the water power and erect an electric plant and also a cotton mill. Work on these enterprises will start next spring.

—Alabama, Mobile. The new yarn mill located at Camp Coppenger has been started up on a small scale.

—Alabama, Kymulga. A new cotton mill is proposed for this place, James W. Baker to be the proprietor.

—*Alabama, Tallassee. The Tallassee Falls Mfg. Co. have completed their new building, which is one of the finest mill buildings in the South. The main building is 448 by 128, four stories, and the building for pickers and lappers, 130 by 70. The whole is constructed of a fine quality of blue granite. The equipment of this mill will consist of 60,000 spindles and 2,000 looms, which will be put in as rapidly as possible.

—*Georgia, Atlanta. A. G. Rhodes, 122 Decatur St., informs us that he can give us no information regarding his proposed new mill, as he has not fully decided whether he will erect it or not.

—Georgia, Calhoun. A $50,000 cotton mill company is talked of, with O. N. Starr and W. J. Rankin as projectors.

—*Georgia, Canton. Application for a charter has been made by A. S. Clay (U. S. Senator), P. B. Latimer, J. M. Price, T. W. Hogan and others, for a new cotton spinning company, to have a capital of $100,000.

—Georgia, Dalton. Horace J. Smith and James Headrick are the parties reported as organizing a new cotton mill company at this place to have $100,000 capital. $55,000 has already been subscribed.

—*Georgia, Newnan. N. F. Cole, interested in the new cotton mill to be established here, informs us that about $100,000 of the proposed $250,000 capital has been subscribed and that nothing further can be said at this time.

—*Georgia, Social Circle. It is now expected that work will be started on the new cotton mill here some time in November, and the plant put in operation in June, 1900. The product is to be three and four-yard sheetings. The name will be the Social Circle Cotton Mills. President, Josiah Blasingame. Capital stock, $100,000. It is the intention to put in 3000 to 4000 spindles and 200 looms; steam power.

—Georgia, Statesboro. J. W. Oliff & Company, B. T. Outland, and others, are intending to form a cotton mill company here.

—Georgia, Williamston. Allen Bates & Company, with Atlanta parties, contemplate establishing a cotton spinning mill, of about 10,000 spindles, the company to be incorporated with $100,000 to $150,000 capital. It is expected that matters will take definite shape within sixty days.

—Kansas, Coffeyville. A committee has been appointed to assist in locating a cotton mill company at this place, consisting of M. A. E. Patton, L. A. Rucker, W. M. Doty, and others.

—*Louisiana, Clinton. Officers of the Clinton Yarn & Cotton Mills have been elected as follows: president, D. W. Pipes; vice president, Isador Mayer; secretary, George J. Ramsey; treasurer, H. H. Forrester. Capital stock is $100,000, and a plant of 2000 spindles will be started probably by January, 1900.

—*Louisiana, Monroe. W. B. Reely, one of the committee to receive subscriptions for the new Cuachita Cotton Mills, informs us that $35,000 has already been raised of the necessary $50,000. Nothing will be done until all is subscribed. He also states that at present there is no practical mill man interested, so that they will need assistance in this direction. Uriah Millsaps, West Monroe, La., will probably be president and general manager.

—Louisiana, New Orleans. W. H. Cook, 345 Carondelet St., is endeavoring to establish a cotton mill here, with $500,000 capital.

—Maine, Springvale. Last week was incorporated the Maine Alpaca Co. The following officers have been elected: President, George B. Goodall; treasurer, L. E. Goodall; clerk, William Batchelder, Jr. Directors, E. M. Goodall, George B. Goodall, L. B. Goodall, H. Hodgson and J. Hollinrake. This company is the one which has bought the mill formerly operated by the Springvale Cotton Co. and will take possession December 1st, by which time the old cotton machinery will be shipped South. The Alpaca Co. will doubtless have its looms in operation by February 1, 1900.

—Massachusetts, Fall River. The Bourne Mill desires to put up a $300,000 plant at Tiverton, R. I., and will do so provided the town will exempt the property from taxation for 10 years; otherwise, another location will be sought.

—*Mississippi, Kosciusko. The new plant here will be known as the Kosciusko Cotton Mills; capital stock $125,000. President, C. L. Anderson; treasurer, Walter Burgess. The first instalment of capital has now been paid in, and 274 acres of land bought. Nearly all of the machinery has been contracted for. The mill will have 5000 spindles and 200 looms; steam power. The product will be three to four-yard goods, probably for export. It is expected to have the plant in operation by October 1, 1900.

—*Mississippi, Okolona. The new Okolona Cotton Mills have been incorporated with a capital stock of $65,000. The officers have been elected as follows: President, E. S. Elliott; vice president, D. McCartley; secretary and treasurer, T. L. Bramlett.

—North Carolina, Charlotte. It is understood that H. C. Dresser, formerly superintendent of the Louise Cotton Mill of Charlotte, and S. B. Alexander, Jr., are endeavoring to establish a new cotton mill here to have $100,000 capital stock.

—*North Carolina, Concord. The Gibson Mill at this place is a new corporation with a capital stock of $100,000. J. W. Cannon is president; R. E. Gibson, secretary and treasurer. The equipment will be contracted for shortly.

—North Carolina, Enfield. George P. Curtis, W. H. McDonald, C. J. Burton and others, are understood to be interested in the proposed new cotton, rope and twine mill at this place.

—North Carolina, Grover. J. G. White contemplates establishing a cotton mill at this place.

—*North Carolina, Hickory. It is now reported that E. L. Shuford has now succeeded in interesting $60,000 capital stock in a proposed new cotton mill. The new mill will probably have $75,000 capital, and it is hoped that the mill will be in operation early next spring.

—North Carolina, Indian Creek. We understand that a new mill has been built here, equipped with 3000 spindles, to make No. 20 yarn. It has been running about two weeks.

—North Carolina, Jamestown. A new cotton mill company has been organized here with $100,000 capital. The interested parties are W. H. Ragan, of High Point, J. S. Ragsdale of Jamestown, and others. It is intended to erect a plant to make brown sheetings.

—*North Carolina, New Berne. A committee in charge of new cotton mill project consists of William Dunn, C. D. Bradham and P. H. Pelletier.

—*North Carolina, Oxford. We understand that J. M. Currier and Dr. E. F. White are the leading men in the movement to establish a $200,000 cotton mill at this place. J. S. Brown will probably be elected secretary and general manager. It is not intended to start work on the plant until $200,000 has been subscribed.

—*North Carolina, Raleigh. The stockholders of the recently chartered Neuse River Mills have elected C. G. Latta, president; R. H. Bante, vice-president, and W. W. Vass, secretary. It is expected that work on its water power developments will soon be started.

—North Carolina, Roanoke Rapids. The Paterson Textile Company informs us that their new building is expected to be completed by March 1st. The product will be silk dress goods. They will use electric power, supplied by the Roanoke Rapids Power Company. The equipment will be 250 looms, with dyehouse. S. F. Paterson is president and treasurer.

—*North Carolina, Spray. The American Cotton Mill & Warehouse Company has been incorporated; Capital stock $200,000, with a privilege of increasing to one million dollars. The incorporators are J. S. McAllister, J. S. Patterson, C. E. Kluge, W. R. Walker, F. L. Fuller. The company is to manufacture jute, hemp, silk, cotton, or woolen goods.

—*North Carolina, Wadesboro. A $100,000 stock company is now proposed for this place, in which C. M. Burns, T. J. Covington, J. D. Horne and others are interested.

—*North Carolina, Wake Forest. Regarding the Royall Cotton Mill, about $65,000 has already been subscribed, and R. C. Royall informs us that he thinks much more will soon be received. He is not yet ready to give particulars. The largest subscribers are W. C. Powell, Savannah, Ga., and himself.

—Pennsylvania, Philadelphia. The Glasgo Mills is a new cotton plant located at Huntingdon and Jasper Sts. The plant is in charge of B. O. Race, who was formerly manager of the Mt. Vernon Mills at Bridesburg, which have been consolidated with the Aberfoyle Mfg. Co. of Chester, Pa. The produce of the Glasgo Mills will be high class novelties in cotton dress and wash goods.

—Pennsylvania, Reading. Emel O. Spindler, 139 North Sixth St., has started a plant for making a fine line of cotton and silk goods.

—*Quebec, St. Henri. We are informed by the Montreal Cotton Co., yarn department, that their new mill here will be in connection with their present property. It will be in operation by May, 1900. Product is to be yarns. It will be equipped with 25,000 spindles and 20 knitting machines, and will have a dye house and also 500 looms. Fred Hawksworth is superintendent. Almost all of the equipment is yet to be contracted for.

—*South Carolina, Greenville. A charter has now been applied for by the Quintin Mills, to have $300,000 capital stock. This is the new company mentioned several months ago, in which are interested

J. Hamlin Beatty, Frank Hammond, G. A. Norwood, and J. I. Westervelt. The capital stock has now been subscribed, and work on the new building will be started very soon. The plant will have 12,000 spindles and 300 looms.

—*South Carolina, Westminster. The intention of W. E. Cheswell is to establish a new cotton mill here, to be known as the Cheswell Cotton Mill Co., ultimately to put in 10,000 spindles and 300 looms. At the start, however, about 6000 spindles with proportionate number of looms will be installed. 36-inch export sheetings will be made. Mr. Cheswell informs us that work will not be started until the full amount of capital stock has been taken up. He proposes to take $50,000 of this amount.

—Texas, Cameron. Much interest is taken in the proposed new cotton mill at this place. Already $9000 has been subscribed. It is the intention to build a small plant at first.

—*Texas, Denison. The American Cotton Spinning Company will probably be ready to start by December 1st. It will be remembered that this mill has never before been equipped with machinery. It will make yarns, 8s to 40s. 5616 of the spindles will be new, and 10,000 second-hand. The company has $100,000 capital. President, J. S. Smith; treasurer, B. M. Seward; superintendent, J. F. Schirmer; steam power.

—Texas, Taylor. J. H. Faubion, president of the Williamson County Farmers' Institute, is endeavoring to locate a cotton mill here, with $75,000 capital.

—Virginia, Richmond. There is a report that the Gallego Mills, which were recently sold to real estate dealers, will be fitted up as a cotton mill, to be known as the Richmond Cotton Mills.

Enlargements and Improvements.

—Alabama, Eufaula. The Chewalla Coton Mills recently enlarged their steam plant, and have now practically decided to double the capacity. It is not decided whether the present building will be enlarged or a separate building erected.

—*Alabama, Huntsville. T. B. Dallas, treasurer of the Dallas Mfg. Co., informs us that the report of their addition is premature, as this matter will not be decided before December at the stockholders' meeting.

—Alabama, Riverview. The Riverdale Cotton Mills at this place, formerly known as the Galeton Cotton Mills of West Point, Ga., have nearly completed the addition to their mill and will soon start putting in machinery, which will give them a total of 12,000 spindles and 338 looms.

—Connecticut, Hartford. Cheney Brothers will put in 200 new looms in their mill here, corner Market and Morgan Streets.

—*Connecticut, Willimantic. The American Thread Co. now has plans in hand for its addition to the finishing department of its mill here, and it is expected that bids on construction will be called for very soon.

—*Georgia, Hartwell. W. S. Witham, who recently bought the Hartwell Cotton Mill, will make necessary changes and repairs to put the plant in first-class condition. It will be known as the Witham Cotton Mills, capital $40,000; product, coarse sheetings and drills. The parties interested with him are: W. L. Witham, Asa H. Smith, F. S. Etheridge, and Harold M. Griffin. Much of the equipment has yet to be contracted for.

—Georgia, West Point. The Lanett Cotton Mills have finished their addition and will soon begin putting in machinery, which consists of 35,000 spindles and 800 looms. It is expected to have this in operation by February 1, 1900.

—Maine, Waterville. The Lockwood Mills have ordered 1000 new Northrop looms, which will be put in about December 1st, to replace their old looms.

—Massachusetts, Milford. It is reported that William Lapworth & Sons are preparing to increase their plant by the addition of six new looms. Their product is elastic cotton fabrics.

—Massachusetts, Pittsfield. The J. L. & T. D. Peck Manufacturing Company have let contract to H. C. Wood & Company for a new dyehouse, 100 by 50, one story, brick, to cost about $5000. A new 125 H. P. boiler will also be put in.

—Massachusetts, Westfield. The capital stock of the William Warren Thread Co. has been increased from $125,000 to $175,000. The plant will be enlarged and plans have been prepared for a two-story addition with about 20,000 square feet of floor space. This will mean the doubling of the capacity.

—New Jersey, Gloucester City. The Argo Mills Co. has a large force at work making alterations in No. 1 mill, in which new machinery will be placed and weaving started up as soon as ready. This department has been closed for about five years, and when running will employ nearly 300 more hands.

—*North Carolina, Cherryville. The Gaston Manufacturing Company has now let the contract to Rudisill & Aderholt for its addition, which will be 75 by 150, two stories. A new cotton warehouse will also be built. It is the intention of this company to add 3328 spindles and 100 looms, which will give them a total of 6656 spindles and 200 looms.

—North Carolina, King's Mountain. The King's Mountain Mfg. Co. is putting in 5000 new spindles.

—North Carolina, Long Shoals. The Long Shoals Cotton Mill has just added 5000 spindles. They will be ready to start up this new machinery in ten days and will manufacture fine yarns from Egyptian cotton.

—North Carolina, Troy. The Smitherman Cotton Mills will put in knitting machinery and have also decided to build next spring another mill of 5000 spindles, to be located three miles south of Troy on Little River. It will use water power and make fine yarns.

—*Pennsylvania, Trainor. The addition now being built by D. Trainor & Sons, cotton yarn spinners, at their No. 3 mill will provide for combing machinery to comb the entire production of the mill. This will include 20 combers. The product of this company is hosiery and underwear yarns, 30's to 80's, in single and two ply.

—Quebec, Montreal. The Merchants Cotton Co. has increased its capital from $1,000,000 to $2,000,000. A large new mill will be built on land near its present structure. This building will be 250 by 110, four stories. An additional power plant will also be erected. Product will be chiefly hosiery yarns.

—Rhode Island, Crompton. The Crompton Co. has placed contract for building a new dye house.

—Rhode Island, Woonsocket. The Eagle Mills will build an addition, 75 by 25. Their contract has been let to George P. Warfield.

—Rhode Island, Woonsocket. The Social Mfg. Co. is building a five-story addition in the rear of its mill, 90 by 80, to be used for storage purposes for the present.

—*South Carolina, Clifton. The Clifton Mfg. Co. informs us that its new addition with 15,000 spindles and 500 looms will not be completed until October, 1900. Product is to be three-yard sheetings.

—*South Carolina, Fork Shoals. The Fork Shoals Cotton Mill Company has been chartered; capital stock $50,000. This step has been taken by W. P. Nesbit, of Piedmont, W. A. Ross, of Fork Shoals, and others. It is the intention to enlarge the present plant.

—*South Carolina, Selma. The new owners of the Estelle Cotton Mills have now decided to add 5000 spindles at once. The machinery has been ordered.

—*Tennessee, Chattanooga. The Richmond Spinning Co. has decided to issue $50,000 more capital stock, and has ordered more carding machinery and expects to operate the plant night and day. This will give them double the capacity that was first intended.

Mills Starting Up.

—*Connecticut, Colebrook. It is now understood that J. W. Hamilton is the party who has secured control of the Sawyer Cotton Mill at this place and that he will replace the old machinery with modern equipment for making cotton duck, and will start up within a short time.

—*Connecticut, Willimantic. The Windham Cotton Mill has now been started up, employing about 150 hands, which number will be probably doubled within a month. This company is now known as the Windham Mfg. Co. Capital, $50,000. President, Melvin P. Horton; treasurer, W. Frank Shove.

—*Kansas, Independence. The new mill of the Kansas Cotton Mill Co. was started up last week. This is the first cotton mill in the State. J. Bolt is president; L. L. Bolt, treasurer; J. M. Harney, superintendent. The capacity of the mill will be 4000 pounds of wrapping twine daily.

—Mississippi, Natchez. The Natchez Cotton Mills will purchase and operate another mill, now idle.

—New Hampshire, Pittsfield. The Pittsfield Cottonware Mfg. Co. has been organized at Nashua. President and treasurer, L. W. Kaime; vice-president, H. W. Dustin; secretary, C. W. Brown. It is expected that their plant will be started up very soon.

—*New York, Chadwicks. We find that our recent report regarding the Chadwicks Mill is not entirely correct. The facts are these: The former Chadwicks Mills have been reorganized and incorporated as the Chadwicks Mills Company. It has passed into the control of most of the old stockholders, to which have been added a number of new holders. Much of the old machinery has been taken out and new put in. It is expected that the mill will be ready to start on yard-wide contract goods, rather finer than those formerly made, by the first of November. F. U. Stearns is treasurer of the new company, and Mr. McDonald superintendent.

—*North Carolina, Chapel Hill. It is now reported that the yarn mill of T. N. Lloyd will be started up. This is equipped with about 4500 spindles. Mr. Lloyd is the sole owner.

—North Carolina, Fayetteville. There is an old cotton mill at this place, known as the Bluff Mill, and it is expected that the Hope Cotton Mills Company, of Fayetteville, will buy the plant and fit it up to be run in connection with its own plant.

—Rhode Island, Rockland. The Rockland Mills at this place, which have been shut down for a long time, will now be started up under the management of A. F. Knight, of Providence, making print cloths. The mill has 10,000 cotton spindles and 222 looms.

—Rhode Island, Shannock. The Shannock Narrow Fabric Co. has been organized here to operate a mill which has been idle for a long time. It is expected that start will be made about November 1. New machinery will be put in for making narrow cotton fabrics.

Mills Shutting Down.

—*Massachusetts, Ashland. The time has now arrived for the shutting down of the Warren Thread Mill here by the American Thread Co., as was announced last spring. Notices have been posted that the employees will be given wages until January 1st, 1900, and will receive employment elsewhere in the different factories of the company as far as possible.

Woolen.

New Mills.

—*Maine, Dexter. The officers of the Wassookeag Woolen Co. have been elected as follows: President, Nathan Daggett; treasurer, David H. Mudgett. The directors include the above parties and Millard E. Mudgett and W. L. Mabbett. Capital stock is $40,000, of which $9000 has been paid in.

—Massachusetts, Concord Junction. The American Woolen Co. has secured large tracts of land here, and it is understood that next spring a very large woolen mill will be erected with a large storehouse capable of holding 25,000,000 pounds of wool. A large shoddy mill will also be built, and foundations for this plant will be started this fall.

—Michigan, West Branch. C. A. Cline informs us that he is about to start up a carding and spinning mill. He has not yet bought his machinery.

—Michigan, Howard City. A. W. Messenger of the old firm of Messenger & Sumner, whose woolen mill was totally destroyed by fire September 4th, will rebuild the plant himself and operate it.

—*North Carolina, Kernersville. A new mill for making fancy dress goods, flannels and blankets will be established here, known as the Southern Woolen Co. Capital stock, $15,000. Treasurer and agent, J. F. Kerner. L. C. Wanamaker will be the selling agent. The plant will have two sets of woolen cards, 12 broad looms and will employ about 25 hands. It is expected to start up November 1. There will be a dye house.

—*Ohio, Cleveland. Saelzer Bros., whose large shoddy mill was recently destroyed by fire, are now having plans prepared by Archt. Frederick W. Striebinger. It is expected that the new building will cost about $10,000, and will be completed early in December.

—Pennsylvania, Doylestown. The Doylestown Worsted Company has been chartered. President, Robert M. Yardley; treasurer, Henry S. Beidler. Property has been purchased, on which is a building, which will be enlarged by a two-story brick structure, 100 by 50 feet. machinery has been ordered.

—*Rhode Island, Woonsocket. The new French-Belgian Worsted Mill, located at Hamlet Village, will be known as the Lafayette Worsted Co., articles of incorporation having been filed. The incorporators are: Andre Simonis, Verviers, Belgium; Pierre Mali, New York, Dexter B. Potter, Providence, R. I. Capital stock, $300,000. Work on the new building is progressing rapidly. The architects are C. R. Makepeace & Co., of Providence, and Benjamin F. Smith of Pawtucket has the building contract. The mill will probably be started up early in the spring, employing 150 hands. The product is to be finest grade of worsted yarns. The concern will be exempt from taxation for a period of 10 years.

—*Rhode Island, Woonsocket. The firm of Henault, Campbell & Youngman has been organized to succeed the firm of Campbell, Henault & Co., who formerly operated the mill at Westerly, R. I., which plant they gave up last May. William L. Youngman will be selling agent of the company in New York. Messrs. Henault and Campbell are the practical manufacturers. They have leased the No. 4 mill of the Woonsocket Machine & Power Co., adjoining the Court St. bridge, and will at once put in machinery. This building is 80 by 40, and a new dyehouse will be built.

Enlargements and Improvements.

—*Alabama, Anniston. The Anniston Carpet Co. will enlarge its buildings and add new machinery. This plant was started up early in the year.

—Connecticut, Norwalk. Twenty Knowles looms will soon be put into the Norwalk & Fairfield Worsted Mill, which will give them a total of 58 looms. Night work has been stopped.

—Connecticut, Rockville. The Hockanum Co. has let contract for a new dyehouse to Arnold & Son. This is to replace the old dyehouse on same site.

—*Georgia, Rossville. Improvements at the Park Woolen Mills consist of an addition to the picker department. No warehouse or office building is being built.

—Maine, Bridgeton. The Pondicherry Woolen Mill will build an addition about 50 feet long. A boiler house will also be erected and two new boilers and a new engine installed.

—Maine, Dexter. Amos Abbott & Co. will put in 12 new looms, which will give them a total of 53.

—Massachusetts, Housatonic. At the Monument Mills 12 new looms are now being set up.

—*Massachusetts, Hyde Park. Work has been started by the R. Bleakie Woolen Co. on its addition of a one-story building, in which will be put finishing machinery.

—Massachusetts, Lowell. The Massachusetts Mohair Plush Company is now reported as to build a further addition.

—New Jersey, Bloomfield. Thomas Oakes & Company will enlarge their woolen mill. They now operate 14 sets and 70 looms.

—Pennsylvania, Darby. Verlenden Bros. are building a one-story addition, 50 by 20, to the finishing room of the Imperial Mills.

—Pennsylvania, Philadelphia. The Bromley & Bros. Carpet Company have recently put in 25 new ingrain looms, and contemplate adding new Smyrna rug machinery.

—Pennsylvania, Philadelphia. John Gray's Sons, proprietors of the Park Carpet Mills, have recently put in 40 new carpet looms, which gives them a total of 200.

—Pennsylvania, Philadelphia. An addition is being built to the Anatolian Rug Manufacturing Company, Jones & Green, proprietors, in which will be put several new looms.

—Pennsylvania, Philadelphia. John Gay's Sons, proprietors of the Park Carpet Mills, have recently purchased 40 ingrain carpet looms, formerly in the Centennial Carpet Mills.

—Pennsylvania, Philadelphia. The Fern Rock Woolen Mills Company is moving its machinery from its mill at Third and Cumberland Sts., to its new plant at Allegheny and Trenton Aves. It has bought 42 new looms, which will give a total of 75. The product is skirtings and golf goods. Frank Clark is superintendent.

—Pennsylvania, Philadelphia. John H. Wallace & Bro., manufacturers of wool waste on Juniper St., above Snyder Ave., have let contract to William Steele & Son for a new brick and iron factory addition, 80 by 90; estimated cost, $6000.

—Rhode Island, Providence. The Atlantic Mills have now acquired the land and building erected by the Union Railroad Co. on Hartford Ave. This is a four-story brick building, 100 by 80. The company's machinery now in the Union Mill will be transferred to its newly acquired building, while the Union Mill is undergoing reconstruction.

—*Rhode Island, Washington. An addition 36 by 70, two stories, is being built at

the Kilton Mill, to be used as a weave shed.

—West Virginia, Martinsburg. The Martinsburg Worsted & Cassimere Mills, which started up early this summer, have now decided to enlarge their building. A brick addition will be built, which will be completed in about two weeks. This will provide for eight new looms.

Mills Starting Up.

—Connecticut, New London. The New London Steam Woolen Mill Co., whose plant on Water St. has been shut down for 16 months, is now being repaired, and will be started up in about a month. This is a five-set mill with 38 looms.

—Massachusetts, Monson. S. F. Cushman & Sons have started up their home mill. Hiram Rathbun, recently superintendent of the Phoenix Mills at Stafford, Conn., will be the superintendent, Rufus P. Cushman retiring.

—Massachusetts, North Oxford. The Chase Woolen Mill at this place has been bought by Caughlin & Son of Rochdale, owners of the Glen Woolen Mill of West Fitchburg. It is their intention to manufacture yarn until the lower part of the mill is completed, when they will make woolen goods. They will employ 150 to 200 hands.

—Massachusetts, Pittsfield. The Pittsfield Mfg. Co., spinners of woolen and merino yarns, have recently started up three sets of cards in one of their buildings and expect soon to have the entire plant running.

—Massachusetts, Pittsfield. The weaving department at the Taconic Mill will be started up to run in connection with the Pontoosuc Woolen Mill. George McGregor will have charge of the weaving.

—*New Jersey, Trenton. The B. W. Titus' Sons Woolen Mill has been sold to Philadelphia parties, who have incorporated the Majestic Woolen Mills Company: $100,000 capital. Interested parties are Joan Williams, George T. Williams, Joseph Williams, all of Philadelphia, and Edward Whitehead, of Trenton. The mill will soon be started up.

—*New York, Warrensburg. The parties who will start up the Warrensburg Woolen Mill have not yet organized their company. Those interested are: L. W. Emerson, J. A. Emerson, T. J. Eldredge and D. S. Mackey of New York. They hope to have the machinery running by November 15th, employing about 25 hands. They have not yet decided upon just what line of goods they will make.

—*Rhode Island, Coventry. Joseph Dews of Washington, R. I., has started up the machinery in the Coventry Worsted Mill. The product is to be worsted goods for men's wear. An addition will be built to the plant. A company will be organized shortly to operate the plant. He expects to put in 20 new looms, employing 100 hands.

Knit.

New Mills.

—Florida, De Funiak. W. L. Cawthon intends to establish a hosiery mill at this place.

—Maryland, Williamsport. A new knitting mill is proposed for this place. Samuel H. Weihenmeyer, Jacob Roessner, and Samuel A. Suter, of Hagerstown, are the interested parties. The mill will employ about 35 hands.

—*Massachusetts, Lowell. George H. Hooper of Lowell is now mentioned as the manager of the new hosiery company to establish a mill here with $100,000 capital. The location of this plant is near the Taylor St. bridge on the east bank of the Concord River. We believe that local capital is largely interested.

—Michigan, Saginaw. William B. Drysdale is investigating the advisability of starting a knitting plant here, and is looking for information on the subject. He may be addressed care of James Stewart Co., Ltd.

—New York, Syracuse. The new knitting mill here will be operated by the Oak Knitting Company, composed of Charles E. Crouse and Adolph Velasko. Mr. Velasko has been manager of the Clinton Knitting Company, of this city, for the last three years. The new mill will be five stories, brick, 50 by 100, with modern equipment, the new plant costing about $40,000, to employ 150 operatives. The product will probably be ladies' and children's ribbed underwear. The contract for the building will be let immediately, and it is expected that the plant will be ready to start by November 1st.

—*New York, Waterford. The Eureka Knitting Mill, J. H. Pynes, proprietor, which was destroyed by fire on September 15th, will be rebuilt. Insurance claims have been settled at $25,000.

—North Carolina, Kernersville. A new knitting mill will be established here by a firm known as Davis, Crews & Co.

—North Carolina, Raleigh. A new knitting mill is proposed for this place. The committee soliciting subscriptions is: G. E. Leach, J. S. Wynne, Joseph G. Brown, and others.

—Pennsylvania, Gettysburg. The Gettysburg Development Co. will put up a hosiery mill for a new concern to be located here, of which Oscar Reily will be manager. Mr. Reily is now located at Mont Alto. The building will be 36 by 52, two stories, with a boiler house. The product will be hosiery.

—*Pennsylvania, Reading. The Hampden Knitting Mills Co. inform us that their new building will be located on North Eleventh St., and will be 50 by 105, three stories. Work on this building will be started about March 1, 1900. This will provide for 20 new knitting machines, which will give them a total of 60. This company now has $20,000 capital. President, Adam H. Leader; treasurer, William Border; superintendent, Francis Scheil. Their product is a full line of ladies' and misses' and half hose; steam power.

—*Wisconsin, Neenah. Regarding the new knitting mill here, we ascertain that it will be called the Jersild Knitting Company. Interested parties are: Rev. J. M. Jersild and Hans Jersild. Production will start about November 1st, on hosiery, sweaters, vests, etc., with about 20 machines.

Enlargements and Improvements.

—Connecticut, Danielson. The Uncas Knitting Co. will put in new machinery, which will double its capacity.

—*Georgia, Union Point. The Union Mfg. Co. informs us that their addition has been completed and machinery started up October 15th. They now have a total of 40 knitting machines and 12 sewing machines. Product is cotton underwear. This company has a capital stock of $20,000. President, S. H. Sibley; treasurer and superintendent, H. S. Lovern.

—*Iowa, Des Moines. The Iowa Knitting Co. has decided to increase its capital stock from $40,000 to $80,000, all paid up. H. M. Rollins, superintendent, is now in the East buying machinery, and it is expected that this will be set up and in operation by January 1st. They expect to have a total production of 500 dozen pairs of stockings a day. At present the mill has about half this number. A dyeing plant will also be put in. The new machinery will be all for making hosiery.

—Massachusetts, Lowell. An addition is being built by the Brown Hosiery Co. on Plain St., where the equipment is now 12 hosiery knitting machines.

—Michigan, Quincy. The Quincy Knitting Mill will build an addition. At present they are making mittens, leggins, etc., with 15 machines.

—*New York, Perry. The Perry Knitting Company has completed plans for doubling its capacity. A large new mill will be built near the old one, two stories high, of brick. It is estimated that the building and machinery of the new plant will cost $100,000, and employ 300 hands.

—*New York, Utica. Work has been started on the foundations for the engine and boiler houses of the Utica Knitting Company. Other improvements will be made to the plant.

—New York, Waterford. The Ford Mfg. Co., of which John W. Ford is proprietor, is building a two-story addition.

—*North Carolina, Newton. The Newton Hosiery Mills inform us that they are now operating 75 knitting machines, and some time next year they expect to increase, but have no definite plans for doing so yet.

—*Pennsylvania, Mohnsville. G. H. Leininger & Company, proprietors of the Industrial Hosiery Mills, inform us that the three-story addition to their mill is now completed, and they are running 57 knitting machines, making cotton seamless hosiery. They employ 60 hands, do their own dyeing, and sell direct.

—*Pennsylvania, South Bethlehem. William H. Jacobs, proprietor of the Halcyon Knitting Mills, Manufacturers of hosiery, confirms our recent report that he is now occupying a space formerly occupied by C. & J. Gould. He intends to put in 40 Standard machines, instead of 30, and also 10 ribbed machines. This will double his production.

—*Pennsylvania, York. The York Knitting Mills Co., which was recently incorporated, has elected the following officers: Hon. W. F. Benjamin Stewart, president; John McCoy, vice-president; Henry L. Field, secretary and general manager, and H. K. Weiser, treasurer. Capital stock is $50,000. New machinery will be added which will increase the output of the plant to 500 dozen per day.

—South Carolina, Jonesville. The Jonesville Knitting Mills, which started up last spring, have recently put in 14 new machines, giving them an equipment of 59. Their capacity is now 320 dozen pairs per day.

—Vermont, Brattleboro. L. A. Gregg, manager of the Electric Hosiery Co., is to enlarge the equipment of his mill.

Mills Starting Up.

—Maine, Springvale. The Alaska Knitting Mill, 42 Murray St., which has been idle for several months, is now starting up. It is understood that the company intends to sell part of its machinery and replace it with more modern equipment.

—*Massachusetts, Easthampton. It is reported that the Ionic Knitting Co. has now arranged its affairs so that it will resume business very soon.

—*New York, Amsterdam. John K. Stewart confirms our recent report that he is to operate the Spartan Knitting Mill, which he recently purchased. The mill will be run as before, and no additions will be made. This is a four-set mill.

—*New York, Waterford. J. H. Pynes has started up such machinery in the Eureka Knitting Mill as was not seriously injured in a recent fire. This will be operated while the plant is being rebuilt.

—Pennsylvania, Towanda. W. J. Young of Towanda has bought the knitting plant here and will start it up soon, making hosiery, employing about 15 hands at the start. He will put in 12 new automatic machines.

—Pennsylvania, Troy. The Loveland Woolen Mills have been leased to James Shelton, of Towanda. Mr. Shelton will make hosiery.

Mills Shutting Down.

Silk.

New Mills.

—Pennsylvania, Allentown. Architects Jacoby & Weishampel, of this place, are preparing plans for the silk mill to be built here, which is to be of brick and iron, 50 by 100, one story, with boiler and engine houses. Contracts have not been let for the building.

—Pennsylvania, Jermyn. A committee, consisting of William Walker, J. D. Stocker, M. J. Eagen, and H. D. Carey, is negotiating for the establishment of a silk mill here, the plant to be removed from another town.

—*Pennsylvania, Lansdale. The new silk mill to be established here will be known as the Lansa Silk Company. Hazelton, Penn. parties are principally interested, including Jas. M. C. Speirs, F. W. Bleckley, Samuel Price and John B. Price. Money will be raised at Lansdale to purchase land. The contract has been let for erecting a building, as reported

last week to John J. Kauflic, at a cost of about $4000. This will be 40 by 110, one story. Other buildings will be put up as soon as needed. The plant is expected to employ about 150 hands. The equipment and machinery are expected to cost about $16,000.

—*Pennsylvania, Lebanon. Dr. A. B. Gloninger has offered land as a site for a new silk mill here, and subscriptions to the amount of $14,000 have been received. It is expected that the plant of Westerhoff Bros. & Napier will be secured, now located at Paterson, N. J.

—*Pennsylvania, York. The York Silk Co. expects to start up its new mill October 15. This company has a capital of $100,000, fully paid up. President, L. S. Stoner; treasurer, Henry Musser; superintendent, M. G. Collins; selling agents, Spielmann & Co. Their product will be broad silk dress goods. This will give them a total of 200 looms, of which 100 are new.

Enlargements and Improvements.

—*Connecticut, Middletown. Work on the addition at the L. D. Brown & Son Co.'s silk mill is now going forward rapidly. This addition will be used for weaving dress silks and linings. It will be about 230 by 60.

—New York, Amsterdam. An addition will be built to the Amsterdam Silk Mill, which will nearly double its capacity.

—New York, Newburgh. Harrison & Gore are putting in 40 new silk looms, which will weave triple width cloth. They have sufficient orders booked to keep the plant running until May.

—Pennsylvania, Harrisburg. The Harrisburg Silk Mill will probably be enlarged, to give employment to 150 more hands.

Mills Starting Up.

—*New Jersey, Phillipsburg. The Burgee Silk Mills Co. is the name of the corporation formed to operate the Ilig & Coene silk plant. Capital stock, $50,000. Gustav Ilig will be manager. Other interested parties are Samuel Prince, John H. Taylor and Isadore Sobel.

—*New Jersey, Phillipsburg. It is now reported that Joseph Firth and Lewis A. Fisher will start up the Ilig & Coene Silk plant, which was recently bought in at auction sale by Mr. Fisher.

—*Pennsylvania, York. The Ashley & Bailey Co. now have their new silk mill about ready to start up. The plant will probably be running in a week or two.

Mills Shutting Down.

Miscellaneous.

New Mills.

—Massachusetts, Lowell. The Lowell Textile Co. has been incorporated with Hughes Fawcett as president; S. E. Pead, treasurer. Capital, $20,000. A new linen mill will be started up by them about November 1 in Lowell, making all linen towels, with a capacity of about 3000 dozen per week. The mill will employ about 100 hands at the start and operate 60 looms. Foreign spun yarns will be bought by Coughlin & Son of Rochdale, used. John Cathrat & Co., 115 Franklin Street, New York, selling agents.

—Massachusetts, Webster. An addition of one story is being built at a portion of the Stevens Linen Mill. 45 new looms will be purchased and will shortly be put in.

—North Carolina, Rockingham. Robert L. Steele proposes to establish a large bleachery and dyeing plant in this vicinity. Several towns are under consideration.

—Pennsylvania, Philadelphia. The Philadelphia Wool Scouring & Carbonizing Co. has been organized under New Jersey laws with the following officers: John Lunn, president, and Chas. Luver, secretary and treasurer. They have located at 1518 Boston Ave., Kensington, and are now installing their machinery, expecting to be ready for business by November 15th. The company will be fully equipped to scour and carbonize wool by a special system invented by Mr. Lunn, who will also act as manager of the plant.

—*Pennsylvania, Wilkesbarre. James A. Dodd, Dogobert St., Firwood, informs us that plans have not advanced far enough for him to give particulars of his new embroidery and lace factory here.

Fires.

—Massachusetts, Lowell. A fire destroyed the building corner Market and Shattuck Sts., known as the Old Card Clothing Mill. The plant was occupied by manufacturers of mill supplies in various lines, and total loss to the building and occupants is estimated at $50,000.

—New York, New York. The Equitable Silk Mill at Cornelia St. and Prospect Ave., Ridgewood, was destroyed by fire October 13th. The loss on stock was $30,000, and the building $15,000. It was a one-story structure, 200 by 100.

—Ohio, Cleveland. The large shoddy mill of the Seeltzer Woolen Co. at 75 Leyden St. was severely damaged by fire. This was a one-story brick building. Loss is estimated at $15,000.

—Tennessee, Trenton. The cotton warehouse at the Trenton Cotton Mills was entirely destroyed by fire October 14, including 600 bales of cotton. Loss is estimated at $25,000.

—Virginia, Portsmouth. The Chesapeake Knitting Mills were damaged by fire October 11th, and have been shut down to make repairs.

Failures and Suspensions.

—Massachusetts, Enfield. David E. Tebo, operating the Enfield Mfg. Co., has filed a voluntary petition in bankruptcy. Liabilities, $13,285, with nominal assets of machinery valued at $300.

—*New Jersey, Paterson. The Kerwen & Warburton Silk Co., recently reported as in financial difficulties, have now filed

a deed of assignment to Alexander D. Walker of New York. The assets are understood to be $19,200 and the liabilities $18,184.

Facts and Gossip.

—*Georgia, Columbus. The Columbus Manufacturing Company has awarded the contract for its new plant to the Flynt Building and Construction Company, Palmer, Mass.

—*Maine, Springvale. The Marston Worsted Mills now have their 20 looms set up and in operation, and the entire plant is very busy, being operated until 9 o'clock each night. At present the finishing is being sent out, but it is hoped that they will soon be able to do their own work in this department.

—Massachusetts, Hubbardston. The Hygienic Blanket Co. recently succeeded the Star Blanket Mfg. Co. at this place.

—Massachusetts, Maynard. The assignees of the Assabet Woolen Co. have given notice that on October 21st a dividend of 30 per cent. will be paid to those who had deposits with the company. A dividend of 25 per cent. has already been paid.

—Massachusetts, Middleboro. The woolen mill of the Star Mills Corporation will be sold at auction November 15th, by Loum Snow, president.

—*Massachusetts, Millbury. Some of the looms have already arrived at the Wheeler Mill, now to be operated by Samuel C. Hull, making linen towels. These will be set up at once.

—Massachusetts, Oakdale. The plant of the L. M. Harris Mfg. Co. will be sold to the Metropolitan Water Board for about $215,000. It is probable that the company will be allowed to continue business at its present location for about a year after the property is sold.

—Massachusetts, Smithville. White Bros. of Winchendon have purchased the cotton mill here, and will probably enlarge the plant.

—*Massachusetts, Taunton. The new yarn company here has been incorporated as the Winthrop Cotton Goods Co. Capital, $150,000. President, C. L. Macomber; treasurer, Abbott F. Lawrence.

—*Massachusetts, Wilkinsonville. It was reported recently that the Sutton Mills had been sold or leased and would be started up. The trustees of the property report that the mills are still for sale. Most of the machinery was sold and taken out about two years ago.

—Michigan, Sault Ste Marie. G. J. Griffith has sold his interest in the Soo Woolen Mill to James W. McTavish. The firm will hereafter be known as McTavish & Cullis.

—New Hampshire, Dover. The Cocheco Mfg. Co.'s mill No. 1 will run all night. This mill is run by steam power entirely, and it is necessary to do this as mill No. 2, which uses water power, has been shut down.

—New Jersey, Montclair. The Harris Manufacturing Company has been incorporated with a capital of $36,000, to manufacture textile fabrics. The incorporators are: Arthur C. Harris, Herbert M. Lloyd, of Montclair.

—New Jersey, Passaic. The Robertsford Worsted Mill was sold on the 4th inst. It was bought by Mrs. Wm. Sulzer of Hackensack for $27,000. She held a mortgage on the property for $25,900. It is understood that the mill originally cost $110,000.

—New Jersey, Paterson. The Acorn Silk Co. has been incorporated with a capital stock of $40,000. The incorporators are Horace G. C. Thornton, of Cranford, N. J., and John Macrae and Osborn Congelton, of New York City.

—New Jersey, Salem. The Salem Knitting Mills will be started up with a night, as well as a day force October 16th.

—New York, Maryville. The McElwee Company has been chartered; capital, $25,000. The incorporators are: J. B. McElwee, H. M. McElwee, J. A. Goddard, C. Chandler, J. L. Clark, all of Maryville.

—New York, New York. The Monopole Weaving Co. has been incorporated with a capital stock of $6000. The directors are Max Bayerle, Louisa A. Marvin and Ferdinand P. Faltz of New York City.

—New York, New York. The Okalona Cotton Mills is the name of a new corporation to manufacture cotton, wool, hemp, etc., with a capital stock of $65,000. The incorporators are T. B. Bramlett, R. W. Chandler, E. J. Ezell, D. H. Shell, Mrs. M. S. Miller, Mrs. A. Darden and H. B. Abernathy.

—New York, Stockport. The Rossman Knitting Company has been chartered; $75,000 capital. The incorporators are: L. J. Rossman, E. J. Rossman, E. L. Camburn, of Rossmans; B. J. Haigh, of Stockport Centre; M. Connor, of Stuyvesant Falls.

—North Carolina, Raleigh. The Raleigh Cotton Mills are to put on a night force, which will double its output of hosiery yarns.

—*Pennsylvania, Chester. The South Chester Mfg. Co. informs us that it is not true that they have leased the Hitchen's Mill on Morton St. They could have leased the building from R. E. Ross, the owner, but could not come to terms with the English firm which owns the machinery.

—*Pennsylvania, Duryea. We note the incorporation of the Duryea Knitting Mill, capital $3000; directors, J. J. McCarty, Wm. Mainwaring, J. F. Regan, J. B. Gilboy and John Polaski. These are the same parties formerly interested in the Duryea Mill.

—Pennsylvania, Manayunk. Arthur and William Johnston, Jr., are now the proprietors of the shoddy mill here, which has been operated for about 30 years by their father, William Johnston. The firm name is now Johnston Bros.

—Pennsylvania, Plymouth. James H. Crossingham recently bought the Ambrose West Mill and will remove his machinery now in Germantown to this mill.

—Pennsylvania, Quakertown. It is reported that the Quakertown Silk Mill, re-

cently severely damaged by a cyclone, will be put in repair and started up as soon as possible. It is expected that $5000 will be needed to do this.

—Pennsylvania, Reading. Louis Kraemer, proprietor of the Stony Creek Mills, is changing his mill over from 3/4 to 6/4 goods. This is a three-set mill with 40 looms.

—Rhode Island, Hope Valley. The Arcadia Cotton Mill was sold at auction to Haines & Bishop, commission merchants of New York, for $12,700. It is understood from the new owners that the machinery will be started up within a month.

Rhode Island, Woonsocket. The hosiery knitting plant of J. P. Gendron, near Willow and Maple Sts., has been sold to the Woonsocket Knitting Co., and machinery will be transferred to the mill of the new owners.

—*Rhode Island, Woonsocket. The Lawton Spinning Co. has increased its capital stock to $600,000. Alterations are progressing rapidly at the Harris Privilege Mill. A French roof is being built to replace the sloping roof. It is reported that all the woolen cards in the old plant have been sold to a party in Dakota, who is using this machinery for the manufacture of linen.

—*South Carolina, Columbia. Work has been started on the plant of the Olympia Cotton Mills, for which T. C. Thompson & Company, of Birmingham, Ala., have the building contract.

—South Carolina, Greers. The Victoria Cotton Mill has notified the secretary of state that its capital stock hs been increased from $150,000 to $350,000.

—*Vermont, Burlington. It is expected that the new building of the Queen City Cotton Mills will be finished and ready for machinery before December 1st. The new engines of 625 H. P. each have arrived and are being set up.

—New Hampshire, Ashuelot. The two woolen mills owned by the late Edward C. Thayer are now offered for sale by F. H. Kingsbury, of Keene, N. H., agent for the heirs.

—Ontario, Toronto. There is a rumor that a large cotton mill located near Boston is to be moved to this vicinity. Nothing definite can be learned. Assessment Commissioner Fleming's name has been mentioned in connection with this project.

—*Maine, Springvale. A local paper reports that Sanford capitalists have purchased the Springvale Cotton Mill, from which machinery has been sold and shipped to the South recently. Probably the purchasers of this mill are those interested in the recently organized Springvale Woolen Co.

—Massachusetts, Agawam. The Agawam Woolen Co. is now running its weave room until 9 o'clock every night to keep up with orders.

—Massachusetts, Fall River. There is a rumor that the American Woolen Co., now owning the Jesse Eddy Woolen Mill, proposes to sell the plant to the Union Mills.

—Massachusetts, Lawrence. At the Arlington Mill on September 29, the large main belt broke and greatly damaged shafting and machinery. The belt is over 125 feet long and four feet wide. No one was seriously injured. It is reported that damage will amount to nearly $10,000.

—*Massachusetts, North Andover. We are informed by M. T. Stevens & Sons that they have not yet completed the purchase of the North Andover Mills, but we understand from them that they are negotiating for this property.

—Massachusetts, Warren. The No. 1 mill of the Warren Cotton Mills was disabled on October 1, owing to the blowing-out of the cylinder head of the engine. No one was seriously injured.

—Alabama, Huntsville. It is reported that the Chamber of Commerce has succeeded in locating a new cotton mill company to build a plant of about 30,000 spindles. The name of this concern has not been given out. It is expected to locate at West Huntsville.

—Georgia, Athens. There is talk of a new company here to establish a cotton mill, with $200,000 capital. It is said that $50,00 is now in sight.

—*Georgia, Canton. It is now reported that $75,000 has been subscribed toward a $100,000 cotton mill company proposed for this place. The interested parties are Robert T. Jones, T. W. Hogan and others.

—Georgia, Columbus. A new cotton mill is talked of for this place, in which M. C. Perry is the party mentioned.

—Georgia, Newnan. Subscription list has been opened for a new cotton mill of $250,000 capital. Interested parties are R. D. Cole, Sr., H. C. Arnold, S. W. Murray and others, all prominent citizens of this place. R. D. Cole, Sr., is president of the Newnan Cotton Mills, which have been very successful.

—*Louisiana, Monroe. The new cotton mill here will be known as the Ouachita Cotton Mills. The capital stock will be $200,000. As soon as $50,000 is subscribed, work on the factory will begin. The committee now receiving subscriptions consists of Uriah Millsaps, W. B. Reily and J. M. Keller.

—*Mississippi, Kosciusko. The Kosciusko cotton factory project is progressing well. C. L. Anderson, Walter Burgess and W. B. Potts are directors. $125,000 has already been subscribed. The contract for machinery has been placed.

—North Carolina, Charlotte. Charles S. Donaldson will endeavor to establish a $60,000-hosiery yarn mill, in which Northern capital will be interested.

—North Carolina, Wake Forest College. W. C. Powell & Company are interested in forming a new cotton mill here, with $50,000 capital. At present it looks as if the mill would be organized and built by next spring. It will be known as the Royall Cotton Mills.

—*Alabama, Huntsville. It is now certain that the Dallas Mfg. Co.'s plant will be doubled. This will mean the building of another mill, costing about $700,000.

—Massachusetts, Monson. S. F. Cushman & Son have wool sorters at work in the Home Mill, and it is hoped that the entire plant will soon be started up.

PERSONAL RECORD.

Cotton.

—A. C. Arnold, who resigned some time ago as overseer of weaving at the mill of the Whitney Mfg. Co., Whitney, S. C., has been secured as overseer of weaving by the Dwight Mfg. Co., Alabama City, Ala.

—Joseph Burnham, overseer of repairs at the Upper Pacific Mills, Lawrence, Mass., has resigned after 42 years steady employment at the mills. F. H. Wallace, chief engineer at the mills, has succeeded him.

—Joseph Byers has been appointed assistant overseer of carding at the Gaffney (S. C.) Mill.

—E. E. Butterfield has secured the position of overseer of weaving at the Millbury Cotton Mills, Millbury, Mass.

—S. T. Borden, the bookkeeper at the Hargraves Mill, No. 1, Fall River, Mass., was the recipient of a diamond pin recently. He has resigned his position at the mill.

—C. B. Cluff, a graduate of the Massachusetts School of Technology, has been appointed instructor in general chemistry and quantitative analysis, at the Lowell Textile School, Lowell.

—Frank C. Colby, after thirty-five years in the employ of the Willimantic Thread Co., Willimantic, Conn., has resigned his position as overseer.

—A. L. Coggins, for the past seven years loom fixer at Salisbury, N. C., has accepted the position of overseer of weaving at the Pilot Cotton Mills, Raleigh, N. C.

—J. H. Creekmore, late overseer of spinning at the Kinston (N. C.) Cotton Mill, is now night overseer of spinning and carding at the Cabarrus Cotton Mill, Concord, N. C.

—W. D. Cookey, overseer of spinning at the Gaffney (S. C.) Mill, has recently accepted a similar position at the Fulton Bag & Cotton Mills, Atlanta, Ga.

—George W. Cummock, superintendent of the Social and Nourse Mills at Woonsocket, R. I., resumed his duties October 2d, after a long absence owing to illness. During his absence Charles Merriman was superintendent.

—L. D. Duval, formerly superintendent of the Cannon Mfg. Co.'s mill at Concord, N. C., has succeeded J. H. Manly as superintendent of the Henrietta Cotton Mill, No. 2, at Caroleen, N. C.

—H. C. Dresser, superintendent of the Louise Mills, Charlotte, N. C., has resigned, and John Crowley, of Charlotte, has succeeded him. Mr. Dresser has become associated with S. B. Alexander and others in the formation of a company to build a spinning mill at this place.

—Haywood Dennis, who has recently recovered from a long illness, has accepted the position of overseer of weaving at the Nos. 1 and 2 mills of the Odell Company, Concord, N. C.

—T. M. Denning, overseer of spinning at the Odell Mills, Concord, N. C., has accepted the superintendency of the Newton Cotton Mills, Newton, N. C. Mr. Denning was formerly of the Durham (N. C.) Mills, only recently going to Concord.

—Ezra A. Dunham, for the past 25 years master mechanic at the mill of the Greene & Daniels Mfg. Co., Pawtucket, R. I., has given up the position.

—Robert Dillon, late overseer of carding at the Fulton Bag & Cotton Mills, Atlanta, Ga., has succeeded M. E. Stephens as overseer of carding and spinning at the Maginnis Cotton Mill, New Orleans, La.

—U. S. Grant Estlowe, late loom fixer at Mays Landing, N. J., is now superintendent of the Oneida Cotton Mills, Graham, N. C.

—S. A. Fowler, of Burlington, N. C., is now designer and boss beamer at the Cannon Mills, Concord, N. C.

—William Farrington is now night superintendent of the new department of the Spray (N. C.) Mills.

—H. J. Forsyth, late with the Draper Co., is now overseer of weaving at May's Landing, N. J., taking Hugh McCorreston's place.

—John W. Greenwood, late of the Lancaster Mills, Clinton, Mass., has gone to Greensboro, N. C., to accept the position of boss finisher of the Southern Finishing & Warehouse Co.

—Paul Garrett, of Charlotte, N. C., has been employed as section hand in the spinning room of the Reidsville Cotton Mills, Reidsville, N. C.

—T. C. Gore, formerly of Nashville, Tenn., is now superintendent of all the carding for the Athens Mfg. Co., Athens, Ga.

—Mr. Hedrick has resigned as instructor in cotton spinning at the Lowell Textile School to return to the Lowell Machine Shop, and his place has been filled by Otis Humphrey.

—Henry Healey has severed his connection with the Merrimack Print Works, Lowell, Mass. He is the oldest engraver of calico print cloth in Lowell and per-

haps in the United States, having worked at the trade for 69 years. He now retires to get more out-door exercise. The employees presented him with a gold headed cane.

—C. L. Hammock, superintendent of the Chewalla Cotton Mills at Eufaula, Ala., has resigned to accept a position with the Porterdale Mills, Covington, Ga., as overseer of spinning.

—James A. Johnston is the new overseer of weaving at the Highland Park Mfg. Co., Charlotte, N. C., taking C. N. Steed's place.

—G. T. Kinnett, superintendent for the past two years of the Lincoln Cotton Mills, Lincolnton, N. C., has secured a similar position at the Willingham Cotton Mills, Macon, Ga.

—J. A. Kenneth is now filling the position of overseer of weaving in the No. 4 mill of the Odell Co., at Concord, N. C.

—C. H. Land, overseer of spinning at the F. W. Poe Mfg. Co.'s mill, Greenville, S. C., has resigned.

—P. F. Lindsay, overseer of weaving at the No. 1 mill of the Hope Mills Mfg. Co., Hope Mills, N. C., has given up the position and returned to his old home in Philadelphia. Augusta Fowler, late second-hand at the mill, has been promoted to the position of overseer of weaving.

—Chester Lanier, overseer of carding in mill No. 2 at Roanoke Rapids, N. C., has resigned and been succeeded by Albert Lynch, boss spinner at the mill. Mr. Lynch will hold both positions for the present.

—F. S. Loomis, boss weaver, has left the Dyerville Mfg. Co., Providence, R. I., and has gone to St. John, N. B., to enter the employ of William Park & Son.

—Lucius L. Milliken, for more than thirty years paymaster for the York Mfg. Co., Saco, Me., has passed in his resignation on account of ill health. E. E. Chadbourne, who for a number of years was assistant paymaster, will probably succeed Mr. Milliken.

—Thomas Mannix is now overseer of spinning at the Aldrich Mill, Millbury, Mass.

—Samuel Molan, assistant overseer of spinning of the No. 2 mill of the Henrietta Co., Caroleen, N. C., has been promoted to the position of overseer of spinning at night in the company's No. 1 mill.

—W. H. McKenzie, superintendent of the Union Springs (Ala.) Cotton Mills has resigned, his health having been impaired in a recent railroad wreck, in which he received several injuries. D. J. Howard, of Haw River, N. C., is his successor.

—Henry C. Moore, day overseer of spinning of the No. 1 mill of the Henrietta (N. C.) Co., has resigned.

—James Pickens is now in charge of the weaving at the Gloucester Gingham Mills, Gloucester City, N. J.

—Samuel Pratt, late superintendent of the Warwick Cotton Mills, of Augusta, Ga., has become superintendent of the Altamahaw Cotton Mill, Elon College, N. C. Overseer of weaving Kitchen will succeed Mr. Pratt as superintendent at the Warwick Mills.

—T. A. Putman of the Mills Mfg. Co., Greenville, S. C., has been promoted to the position of assistant superintendent.

—Harry Pilkington, formerly of May's Landing, N. J., is now with the Millville Mfg. Co., Millville, N. J. He was presented with a handsome Masonic gold charm by his help upon taking leave for his advanced position.

—W. E. Russell, formerly second-hand in the card room at the Proximity Mills, Greensboro, N. C., has gone to Salisbury, N. C.

—William Roberts, for several years employed in the cloth room of the Fall River Iron Works, has become foreman of the cloth room in the Seaconnet Mill, Fall River, Mass.

—J. A. Richards, who has been 17 years second-hand in the spinning room of the Willimantic Linen Co.'s mill No. 2, Willimantic, Conn., has been promoted to overseer of spinning in mill No. 4.

—William Smith, overseer of weaving at the Tecumseh Mill No. 1, Fall River, Mass., after twenty years of continuous service, has resigned. Many of the employes gathered at his home Friday evening, October 14th, and presented him with a gold headed cane and a gold watch chain.

—S. B. Shipp has accepted his old position as superintendent of the Chewalla Cotton Mills, Eufaula, Ala.

—John F. Shackleton, who has been overseer of weaving at the Methuen Mills, Methuen, Mass., for about eight years, is acting as superintendent of the Pemberton Mills, Lawrence, Mass., James R. Bailey having left the city.

—Samuel Smithers, overseer of spooling and carding in the Arkwright Mills, Fall River, has changed to a similar position in Wampanoag Mill, No. 2, in that city.

—J. A. South, formerly of Tuscaloosa, Ala., has accepted the position of overseer of spinning at the Willingham Cotton Mills, Macon, Ga.

—O. W. Stites has accepted the superintendency of the Commonwealth Mfg. Co., Durham, N. C.

—A. D. Steadman, formerly second-hand in weave room at the Poe Mill, Greenville, S. C., has been promoted to the position of overseer of weaving.

—Frank D. Savage, formerly assistant overseer of spinning in the No. 2 mill of the Cannon Mfg. Co., at Concord, N. C., recently accepted the position of night superintendent of the No. 1 mill of the Cannon Mfg. Co.

—J. W. Trigg, of Alabama City, Ala., has been appointed assistant overseer of weaving at the Dallas Cotton Mill, Huntsville, Ala.

—O. B. Truesdell, for the past 13 years agent of the Fiskdale Mills, Fiskdale, Mass., has been appointed general manager of the Central Mills Co., Southbridge, Mass.

—Everett E. Tripp, for a number of years bookkeeper at the Globe Yarn Mills, Fall River, Mass., has been transferred to the American Yarn Co., New Bedford, Mass.

—J. W. Thomiston is now filling the position of overseer of weaving at the South Side Mfg. Co.'s mill at Salem, N. C.

—John Tripp, overseer of spinning at the mill of the Albion Co., Albion, R. I., has accepted a similar position at Lonsdale. He is succeeded by Mr. Brouillard of Centerville, Conn.

—S. E. Thayer, second-hand in the machine shop at the Warren Cotton Mills, West Warren, Mass., has given up that position to take a position as master mechanic in Blackstone, Mass.

—A. H. Weems, formerly at Roswell, Ga., has secured the position of overseer of weaving at the Porter Mill, Cornelia, Ga.

—H. L. Witham, superintendent of the Fulton Bag & Cotton Mills, Atlanta, Ga., has tendered his resignation. He is to take the management of the Hartwell (Ga.) Cotton Mill, recently purchased by W. S. Witham, of Atlanta.

—George H. Winsor, who for a number of years has been boss mechanic at the Hadley Co., Holyoke, Mass., now controlled by the American Thread Co., has resigned, and Isaac Berry, of the repair department of the Merrick Thread Co. division of the American Thread Co., has succeeded him. Edward Crowthers, boss of the warp department of the Hadley Co., has also resigned.

—J. R. Withers, for the past three months filling the position of secretary and treasurer of the Alpha Mills, Charlotte, N. C., has resigned.

—J. H. Wood, second-hand spinning at Swift's Cotton Mill, Elberton, Ga., has resigned to accept the position of night overseer of spinning in the Grendel Mills at Greenwood, S. C.

Woolen.

—George Smethurst has resigned his position as overseer of spinning at the Assabet Mills, Maynard, Mass., in which capacity he has served for over twenty years. Mr. Smethurst holds a number of patents on woolen and other machinery and his retirement is due to a desire to introduce these patents in manufacturing circles.

—C. W. Amel is now superintendent at the Hargraves Woolen Mill, North Shapleigh, Me., in place of J. S. Bellows.

—Walter Ayers, for five years designer at the Greenville (R. I.) Woolen Mill, is now with the Leominster (Mass.) Worsted Co. in the same capacity.

—A. L. Bowes has tendered his resignation as superintendent of the Lawrence Felting Co., Millville, Mass., to accept the superintendency of the Bowden Felt Mills, Millbury, Mass.

—William Brennan, recently engaged as overseer of carding in the French River Textile Co.'s mill, Mechanicsville, Conn., has terminated work there.

—Frank A. Brown, of Bridgeton, N. J., is now filling the position of boss finisher at the mill of the Stafford Woolen Co., Staffordville, Conn.

—Harry Cook, of Harrisville, R. I., has accepted a position with the Globe Woolen Co., Utica, N. Y.

—P. Curley, formerly overseer of carding in the Taconic Mills, Pittsfield, Mass., has secured a similar position with W. E. Tillotson of Pittsfield.

—Edward Craven, formerly superintendent with the Columbia Worsted Co., Wallingford, Pa., has accepted a position with the Farbenfabriken of Elberfeld Co., and will represent them in New Jersey, Pennsylvania and the southern section of Philadelphia.

—Rufus P. Cushman, who has been superintendent for several years of S. F. Cushman & Sons' mill in Monson, Mass., has resigned, and Hiram Rathburn, late superintendent of the Phoenix Mills at Stafford, Conn., has been engaged as superintendent.

—Frank Dickey is now overseer of carding for the Algonquin Co., Passaic, N. J., having succeeded Herman Haigh, who is now in a similar position with the Folwell Bros. & Co., in the Collingwood Mills, Philadelphia, Pa.

—John Fitzpatrick of Plymouth, Mass., has succeeded Joseph Sykes as designer at the Old Town (Me.) Woolen Mills.

—James M. Fraser is now boss carder with the Allen Woolen Mills, Hanover, Conn.

—John Fanning, overseer of the wool sorting department of the Washington Mills, Lawrence, Mass., was tendered a farewell reception by his employees in Matthes Hall, where he was presented with a gold ring.

—Ferdinand J. Feeley, for the past three years employed as assistant foreman in the spooling department of the Perseverance Worsted Co., Woonsocket, R. I., has resigned.

—Edward A. Gibbs, overseer of wool sorting at the Pondicherry Mills, Bridgton, Me., has retired from active service.

—Joseph Hum, formerly at A. Flanagan & Bro.'s mill at Manayunk, Philadelphia, has recently accepted charge of one of the weave rooms of the Economy Mill, at the same place.

—Henry Harrington, overseer of weaving room at the Mayo Woolen Mill, Millbury, Mass., has resigned and his place is now being filled by Dana Labonian.

—Armand Henault of Westerly, R. I., is the new boss dyer for the Schaghticoke Woolen Co., Schaghticoke, N. Y.

—Earle C. Hopkins, resident agent of the Jesse Eddy Mill, Fall River, Mass., one of the mills of the American Woolen Co., has resigned.

—Timothy E. Hopkins has resigned as treasurer of the Eddy Woolen Mill, Fall River, Mass. This mill is now a part of the American Woolen Co.

—Arthur Jackson, overseer of drawing in No. 2 mill of the National & Providence Worsted Mills, Providence, R. I., has changed to a similar position in the No. 1 mill of the same concern.

—Lawrence Love, formerly of Fulton, N. Y., but more recently of Philadelphia, has succeeded J. O. Crowley as boss weaver at the mill of Robert Bleakie & Co., Hyde Park, Mass.

—Richard Locke has severed his connection with the Great Falls Woolen Co., Somersworth, N. H., in whose mill he has been employed as assistant superintendent and pay-master. Mr. Locke has gone to New York City, where he has secured a position in a commission house.

—Joseph Moore recently resigned as overseer of carding for Folwell Bros. & Co., Philadelphia, Pa., and Herman Haigh, formerly overseer of carding with the Algonquin Co., Passaic, N. J., has succeeded him. Mr. Moore is now in the employ of William Wood & Co., Philadelphia, Pa.

—Arthur McQuillian, overseer of the finishing department of the Great Falls Woolen Co.'s mill, Somersworth, N. H., has been promoted to the position of assistant superintendent.

—Frank Mulholland, a well-known young man of Olneyville and formerly a dresser tender in the Riverside Worsted Mills, has started a course in textile designing at the Philadelphia Textile School.

—Henry G. Morey of Jewett City, Conn., is now overseer of carding at the Glen Woolen Mill, Shewville, Conn.

—D. J. O'Keefe, formerly boss finisher with the Old Kentucky Woolen Mills at Louisville, Ky., is now filling a similar position with the Hudson River Woolen Mills of Newburgh, N. Y.

—M. A. Robinson, superintendent of the Fowden Felt Mill, Millbury, Mass., has resigned and accepted a position in Boston.

—Morris Stack has secured the superintendency of the Troy Waste Mfg. Co.'s Mill in Cohoes, N. Y., succeeding Thomas Cocker.

—Ernest A. Sutcliffe has accepted the position of dyer at the Oneko Mills, New Bedford, Mass.

—James Shaw, formerly of Dracut, Mass., has been engaged as boss weaver at Ashland, N. H.

—Charles Willis, of Fall River, Mass., has accepted a position with the Hockanum Co., Rockville, Conn.

—Edward Whitehead has been engaged as manager of the mills formerly operated by R. W. Titus' Sons, Trenton, N. J., now owned by the Majestic Woolen Co.

—M. G. Webster has succeeded Thomas Fielding as overseer of spinning in Lawrence Keegan's woolen mill in Wilsonville, Conn.

—Henry Willis, formerly boss weaver at Wetheredville, Md., has accepted a position on the night force of the Oakland Mills, Haight, Md.

Knit.

—George W. Busiel has resigned his position at the Sulloway Mills, Franklin Falls, N. H., for a position as boss knitter on ribbed and flat underwear with the Portage Underwear Co., Portage, Wis.

—E. L. Childs, overseer for 15 years in the box room of the Lawrence Mills, Lowell, Mass., has accepted a similar position at the Shaw Stocking Co., in that city.

—W. C. Hazer, foreman of the finishing room of the Ailing Knitting Mill at Derby, Conn., has accepted a similar position with the Himes Underwear Co., Cohoes, N. Y. He entered upon his new duties November 1.

—Otis H. Hyer has been advanced to the position of general superintendent of Robert MacKinnon's knitting mill, Little Falls, N. Y. He has been connected with the mills for the past eleven years.

—John Michaels has recently resigned as overseer of carding in W. E. Tillotson's mill, Pittsfield, Mass., and accepted a similar position with the Alpha Knitting Mills, Schenectady, N. Y., succeeding Michael Niertney.

—David McGenniss, formerly superintendent of the Ionic Knitting Co., Easthampton, Mass., has taken his old position as superintendent of the South Side Knitting Mills at Amsterdam, N. Y.

—J. D. Price recently accepted a position as boss dyer in the new dye house of the Knitted Fabrics Co., Methuen, Mass., and will remove his family from Pawtucket, where he previously resided.

—Charles H. Porter, recently at St. Hyacinthe, P. Q., has accepted a position as superintendent of the Fay Stocking Co., at Elyria, O.

—John P. Stack has severed his connection with the Sagamore Knitting Co., Mechanicsville, N. Y., where he has held the position of superintendent, and has accepted a position with the Virginia Textile Co., Lynchburg, Va., a new knitting mill corporation which will soon be started in operation.

—William G. Terry, who has been connected with the MacKinnon Mill in Little Falls, N. Y., as traveling salesman for a number of years, has severed his connection with the concern.

—W. H. Thomas has secured the position of boss knitter in the Rockton Knitting Mill, Little Falls, N. Y.

Miscellaneous.

—Eugene F. Freund, formerly superintendent of the broad silk department of the Paterson Ribbon Co., Paterson, N. J., is on an extensive trip through the West for the benefit of his health, and will be open for an engagement by the first of the coming year.

—J. A. Elwood, formerly of the Lowell Bleachery, Lowell, Mass., is now in charge of bleaching at the Worcester Textile Co., Franklin, Mass.

—J. R. Bloom, formerly bookkeeper for the Willimantic Cotton Mills, has secured a similar position with A. G. Turner, a silk manufacturer of Willimantic, Conn.

Deaths.

—Spencer M. Janney, senior member of the firm of O. S. Janney & Co., of Philadelphia and Boston, died October 20th at his Philadelphia home, 910 Clinton St., to which he had but recently removed from his Chestnut Hill residence. Mr. Janney has been in ill health for some time, but had continued to attend to his numerous business interests, and even so late as the preceding Saturday had been at the office of the Huntingdon & Broad Top Railroad, of which he had been president since 1890. Of late years his time was given almost entirely to his railroad and financial interests. He was also a director of the Choctaw, Oklahoma & Gulf Railroad, Farmers' & Mechanics' Trust Co. and vice-president of the Colonial Iron Co. at Riddlesburg. He was a man of great business activity and energy and had a wide circle of business and social friends. Although of late years he had not been in so close personal touch with the mill trade, he had made such strong connections during his active connection with O. S. Janney & Co. that many of the leading textile manufacturers will count his death as a personal loss.

—Hugh H. Osgood, president of the Norwich Dyeing, Bleaching & Printing Co., Norwich, Conn., died at Manlius, N. Y., October 23d. He was attending a convention at Buffalo. He was 78 years old. A widow and one sister survive him.

—D. E. Converse, president of the Clifton and Glendale Cotton Mills in South Carolina, died October 4th. Mr. Converse entered a woolen mill when a boy and passed his life in the atmosphere of a mill. In 1860, when the war broke out, he manufactured and furnished goods for the soldiers, and to him, in a great measure, is due the ebginning of the cotton mill building in this state. His name will be long and gratefully remembered as the founder of Converse College.

—Rowse Babcock died at his home in New York, October 16th, after an illness of eight weeks. Mr. Babcock was born in Westerly, R. I., Aug. 30, 1844, where he resided until about the year 1873, when, together with his cousin, Albert Babcock, he purchased the mill at Potter Hill, and operated it for a number of years under the firm name of R. & A. Babcock. This mill was bought from them by J. P. Campbell, who has operated it ever since. Mr. Babcock was manager of the woolen goods department of Converse, Stanton & Davis until the firm dissolved in 1885, when he assumed the management of the domestic woolen goods department of Vietor & Achelis, with which firm he was associated at the time of his death.

—John Ainley, president of the Crosby Mfg. Co., East Glastonbury, Conn., died recently, aged 59 years. He came from England to East Glastonbury about 25 years ago, accepting a position with the Crosby Mfg. Co., where he became overseer of the carding and spinning department and later an officer of the company.

—Edward J. Stephens died recently at his home in Pawtucket, R. I., aged 64 years. He came to this country from England about 35 years ago, and was one of the first to carry on the yarn printing business in America, his partner being Hiram Green. For the past 15 years he had been conducting business in Pawtucket, R. I.

—George H. Meserve, overseer of the spindle department of the Saco & Pettee Machine Shop, Saco, Me., died at his home in that city Monday afternoon, October 23d. He was 70 years old, and had worked for 34 years within the machine shop.

—John C. Newton, a prominent citizen of Holyoke, Mass., died October 7th in Wilmington, Vt. Upon finishing his education, he learned the carpentering trade. He built most of the mills in Holyoke, besides a number of other buildings, and owned stock in the Farr Alpaca Co., William Skinner's silk mill, and many paper mills.

—Norris Blackburn, superintendent of the Victoria Mill, Thornton, R. I., died recently, aged 40 years. He was born and educated in Bradford, Eng., and two years ago came to this country and took charge of the above mill. A wife and two children survive him.

—Greeley W. Hastings, for thirty years overseer of the laboratory at the Manchester Print Works, Manchester, N. H., committed suicide September 28th by stabbing. He had been in ill health for some little time past and it was through despondency he committed this act.

—Thomas James, a well known loom fixer in Fall River, Mass., died at his home October 14th.

—Patrick Kelleher, an employee in the Lowell Machine Shop, Lowell, Mass., for the past 25 years, and well-known throughout the city, died recently at his home.

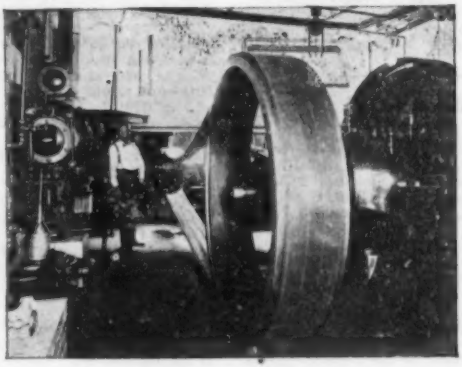
—John A. Haskell, for 15 years overseer of outside work for Josiah Perry, a woolen manufacturer of Webster, Mass., died last month.

—Jesse M. Gould, who assumed his new duties as boss carder at the Hope Valley Woolen Co., Hope Valley, R. I., Tuesday, October 2d, died that afternoon while at work in the mill, his death being due to apoplexy. He was 56 years old.

—Stanilaus Bernier was killed while at work repairing the flume at the Pocasset Mill in Fall River, Mass. He was 56 years old.

—John R. Young, for twenty years an engraver at the Manchester Print Works, Manchester, N. H., died October 13th, at the age of 81 years. He had also worked in Fall River mills, as well as at North Adams.

—John Stuart, overseer of the beaming and slashing department at the Everett Mills, Lawrence, Mass., for the past 16 years, died at a sanitarium at Penacook, N. H., where he had been for some months for his health.



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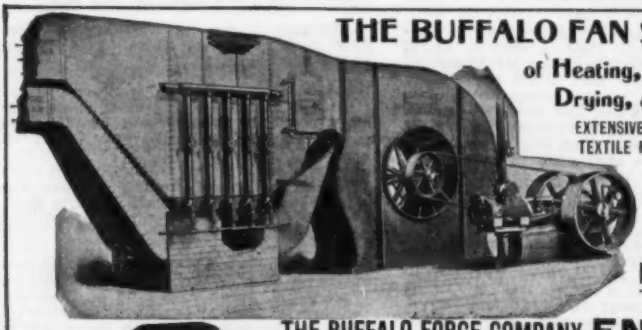

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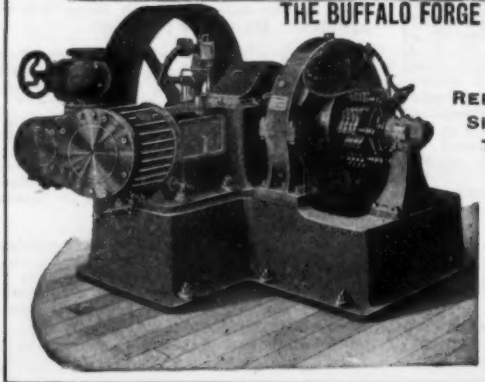

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BUYERS' INDEX.

Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

Alphabetical Index to Advertisements follows this Classified List.

Air Moistening System.
American Moistening Co., 150 Devonshire St., Boston.

Architects and Mill Engineers.
Berlin Iron Bridge Co The, East Berlin, Ct.
Ferguson, John W., Paterson, N. J.
Tower & Wallace, Broadway and 25th St., New York, N. Y.

Automatic Feeds for Cotton and Wool.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Balling Machine.
Torrance Mfg. Co, 18 Davis St, E. Newark, N. J.

Bandings.
See under Yarns.

Belting.
Albany Belting & Supply Co., Albany, New York.
Alexander Bros., 410 No. 3d St., Phila., Pa.
Hammer, C. H. & Co., Philadelphia.
Link Belt Machinery Co., Chicago, Ill.
Popham, Henry, & Son, Newark, New Jersey.
See also Mill Supplies.

Belt Dressing.
Alexander Bros, 410 No. 3d St, Phila, Pa.
Cling Surface Co., 168 Virginia St., Buffalo, N. Y.

Belt Hooks.
Stuart & Audel, 389 Grand Ave., New Haven, Conn.

Bindings.
See Tapes and Braids.

Bleaching Materials.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Bobbin Holder and Thread Catcher.
Burr Bobbin Holder and Thread Catcher Co., Hartford, Conn.

Bobbins, Spools, Shuttles, Etc.
Nashua Spool and Bobbin Co., Nashua, N.H.
Parker, Henry Co., Springfield, Vt.
Tebbets, E. L., & Co., Locke's Mill, Me

Boiler Compounds.
Straus & Co., 59 Broad St., New York.

Boiler Coverings.
The Norristown Covering Co., Ltd, Norristown, Pa.

Boxes, Cloth Boards, Etc.
Pearson, J. T, Kensington, Pa.

Braiding Machinery.
New England Butt Co., Providence, R. I.
Thun & Janssen, Reading, Pa.

Braids.
See Tapes, Braids and Edgings.

Brass (Perforated.)
See under Perforated Metal.

Bridges.
The Berlin Iron Bridge Co, East Berlin, Conn.

Brushers.
See Napping Machines.

Buildings (Steel).
The Berlin Iron Bridge Co., East Berlin, Conn.

Burr Pickers.
Curtis & Marble Machine Co., Worcester Mass.
Sargent's, C. G., Sons, Graniteville, Mass.

Calico Printers' Machinery and Supplies.
Birch Brothers, Somerville, Mass.
Butterworth, H. W., Sons & Co., Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
New Bedford Copper Co, New Bedford, Mass.
Phillips Co, The Thomas, Providence, R. I.
See also Dyeing, Bleaching Machinery, etc.

Card Clothing.
Ashworth, Elijah, Fall River, Mass.
Hammer, C. H. & Co., Philadelphia.
Leigh, Evan A, 35 Mason Building, Boston.

Card Grinding Machinery.
Hardy Machine Co., Biddeford, Me.

Carders' Tools.
Brown, W. H, Mechanic St, Worcester Mass.

Carpet Machinery.
Altemus, W. W, & Son, 2816 N. 4th St Phila. Pa.
Curtis & Marble Machine Co, Worcester, Ms.
Furbush, M. A, & Son, Machine Co, Phila, Pa.
Granger Foundry & Machine Co., Providence, R. I.
Howard, Geo. C., 1788 Barker St., Phila., Pa.

Chemicals and Apparatus.
Bullock & Crenshaw, 528 Arch St, Phila, Pa.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Chemist.
Adriance, John S., 105 East 39th St., New York.

Clutches.
The Eastern Machinery Co., New Haven, Conn.
James Hunter Machine Co., North Adams, Mass.
American Tool & Machine Co., Boston, Mass.

Coal, (Anthracite and Bituminous.)
Whitney & Kemmerer, 143 Liberty St, N.Y

Combs (Wool and Cotton).
Crabb, William, & Co, Newark, N. J.

Commission Merchants (Dry Goods).
Dusenbury, C Coles, & Son, 396-398 Broadway, New York.
Hayes, O. H., 10 Thomas St., New York.

Copper (Perforated.)
See under Perforated Metal.

Copper Print Rollers.
New Bedford Copper Co, New Bedford Mass.
Phillips Co, The Thomas, Providence, R. I.

Copper Work for Dyers.
Butterworth, H. W. & Sons Co., Philadelphia.
Burkhard, Thomas, 494 Flushing Ave., Brooklyn, N. Y.
Granger Foundry & Machine Co, Providence, R. I.
Phillips Co, The Thomas, Providence, R. I.

Corrugated Iron Shutters.
The Berlin Iron Bridge Co., East Berlin, Conn.

Cotton (Egyptian).
Stoddard, Haserick, Richards & Co., Boston.

Cotton Machinery.

Altemus, W. W, & Son, 2816 N 4th St, Phila-Pa.
Ashworth, Elijah, Fall River, Mass.
Butterworth, H. W. & Sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Mass.
Draper Company, Hopedale, Mass.
Easton Burnham Co., Pawtucket, R. I.
Fairmount Machine Co, 22d and Wood Sts, Philadelphia.
Howard & Bullough American Machine Co, Pawtucket, R. I.
Kilburn, Lincoln & Co, Fall River, Mass.
Leigh, Evan A, 35 Mason Building, Boston.
Lowell Machine Shop Lowell, Mass.
Mason Machine Works, Taunton, Mass.
McKerrow, H. G & Co., Boston, Mass.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, Pa.
Philadelphia Textile Machinery Co, Hancock and Somerset Sts, Philadelphia, Pa.
Phillips Co, The Thomas, Providence, R. I.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Whitin Machine Wks, Whitinsville, Mass.
Woonsocket Machine & Press Co, Woonsocket, R, I.

Cotton Openers and Lappers.

Howard & Bullough American Machine Co, Pawtucket, R. I.

Cutters for Knit Fabrics.

Kennedy, Thos. (Cutters, etc.,) Cohoes, N. Y

Decoration Wash for Interiors.

Moore, Benj. & Co., Brooklyn, N. Y.

Designer.

William Keiller, 28 Queen St., Belfast, Ire.

Dextrine.

Stein, Hirsh & Co, 165 Duane St., New York.

Dryers.

Birch Brothers, Somerville, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Butterworth, H. W. & Sons Co., Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
Kenyon, D. R. & Son., Raritan, N. J.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Philadelphia Textile Machinery Co, Philadelphia, Pa.
Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Dusters.

See Wool and Waste Dusters.

Dyers, Bleachers and Finishers

American Yarn Printing Works, 134-150 North 22d St., Philadelphia.
Boston Finishing Works, Williamstown Mass.
Brophy's, T, Sons, Jasper St, Philadelphia.
Cohoes Dye Works, Cohoes, N. Y.
Cranston Worsted Mills (yarns), Bristol R. I.
Firth & Foster Co, Kensington, Pa.
Greenwood, R. & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket and Valley Falls, R. I.
Littlewood, G. J. & Sons, Manayunk, Pa.
Lorimers, The Wm. H. & Sons Co, Phila.
Molt Bros., Millbury, Mass. (Indigo Blue.)
New England Thread Co, Pawtucket, R. I.
Novelty Dye Works, Cincinnati, Ohio.
Orianna Bleach Works, 2540 No. 3d St., Philadelphia.
Pawtucket Dyeing & Bleaching Co, Pawtucket, R. I.
Rowland, Samuel, Schuylkill Haven, Pa.
Warren, W, Thread Works, Westfield, Mass.

Dyeing, Drying, Bleaching and Finishing Machinery.

Birch Bros., Somerville, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Butterworth, H. W, & Sons Co, Phila, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Co, 22 and Wood Sts, Philadelphia.
Granger Foundry & Machine Co, Providence, R. I.
Hopkins, Machine Works, Bridgeton, R. I.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Kenyon, D. R. & Son, Raritan, N. J.
Lincoln, The. Co, 54 Arch St, Hartford, Ct.
Peel, Samuel H. Germantown, Philadelphia Pa.
Phenix Iron Foundry, Providence, R. I.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, Pa.
Philadelphia Textile Machinery Co, Hancock and Somerset Sts, Philadelphia, Pa.
Phillips, The Thomas Co, 91-95 South Main St, Providence, R. I.
Risden Machine Co., Warren, R. I.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass. (Drying.)
Weihe, H. C. Philadelphia.
Woonsocket Machine & Press Co, Woonsocket, R. I.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Dye Sticks.

Bailey, Frank, Cedar Brook, New Jersey.
Haedrich, E. M, 311 1-2 Walnut St, Phila, Pa.

Dyestuffs and Chemicals.

Amend Process Co., 205-211 Third Ave., New York.
American Aniline Co., 138 No. Front St., Philadelphia.
Anchor Color Mfg. Co, 464 Cherry St, New York.
Atteaux, F. E. & Co., 174-176 Purchase St Boston.
Berlin Aniline Works, 72 Front St., N. Y.
Bischoff, & Co, 87 Park Place, N. Y.
Bosson & Lane, 36 Central Wharf, Boston.
Corey, S. J, 273 Congress St, Boston.
Dillon & Co, 20 Cedar St, New York.
Farbenfabriken of Elberfeld Co, 40 Stone St, N. Y.
Geisenheimer & Co, 189 Front St, New York.
Innis & Co, 3 Cedar St, New York.
Jaeck Bros., The, Co., 62-68 No. 11th St, Brooklyn, N. Y.
Janney, O. S, & Co, Phila. and Boston.
Johnson, Chas. A, & Co, 22 Dey St, N. Y
Johnson, Wm. G, & Co, Uncasville, Conn.
Keller, John J, & Co, 104 106 Murray St, N. Y.
Klinstein, A, & Co, 122 Pearl St, N. Y.
Koechl, Victor, & Co, 122 Hudson St, N. Y.
Matheson, W. J. & Co, 182-184 Front St, N.Y.
Merrimac Chemical Co, Boston, Mass.
Molt Bros. Millbury, Mass. (Indigo Blue.)
N. Y. & Boston Dyewood Co, 55 Beekman St, New York.
Oakes Mfg. Co, 93 Pearl St, N. Y.
Palmetto Co., The, 942 44 Drexel Building, Philadelphia.
Pickhardt & Kuttroff, New York.
Richmond & Foley, 235 N Front St., Philadelphia.
Roessler & Hasslacher Chemical Co, 100 William St, New York.
Sharpless Dye Wood Ext. Co, 22 N. Front St, Phila, Pa.
Stamford Mfg. Co, 133 137 Front St., N. Y.
Stone & Ware Co, The, 157 Maiden Lane. N. Y.
Sykes & Street, 85 Water St, N. Y.

Edgings.

See Tapes, Braids and Edgings.

Electrotyping and Printing.

Whitcomb, H. C, & Co, Boston.

Elevators.

Cohoes Foundry & Machine Co, Cohoes, N.Y.
Eastern Machinery Co, The, New Haven, Conn.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Electric Light.

Lynn Incandescent Lamp Co., Lynn, Mass.

Engineers, Mechanical.

Berlin Iron Bridge Co., The, East Berlin, Conn.
Ferguson, John W, Paterson, N. J.

Fans—Exhaust and Ventilating.
See Ventilating Apparatus.

Feed Water Heaters.
Kelley, Benj. F. & son, 91 Liberty S New York.

Feed Water Pumps.
Goulds Mfg. Co, Seneca Falls, N. Y.
Phœnix Iron Foundry, Providence, R. I.

Finishing Machinery.
See Dyeing, Drying, Bleaching and Finishing.

Fireproof Construction.
The Berlin Iron Bridge Co., East Berlin, Conn.

Fluted Rolls.
Cohoes Foundry & Machine Co, Cohoes, N.Y
Thurston, A. G, & Son, Box 528, Fall River Mass.

Foundry Castings.
Plainfield Foundry Co., Plainfield, N. J.

Friction Clutches.
See Clutches.

Friction Hoisting Drums.
Eastern Machinery Co., New Haven, Conn.

Fulling Mills for Woolen Goods.
Hopkins, Machine Works, Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter Jas, Machine Co, No. Adams, Mass.

Gas Engines.
Jones, Lewis, 60½ and Media Sts, Phila, Pa.

Gas Singeing Machines.
Birch Brothers, Somerville, Mass.
Butterworth, H. W. Sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Ms.
Granger Foundry & Machine Co., Providence, R. I.

Gear Cutting Machine.
Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E. Co, New London, Conn.

Harness Varnish.
D. L. Witmer & Bro, 5th St. and Germantown Ave, Philadelphia.

Heating.
See Ventilating.

Heddles.
Watson, L. S, Mfg. Co, Leicester, Mass.

Hoisting Machinery.
The Eastern Machinery Co., New Haven, Conn.

Hosiery Boards.
Pearson, J. T, Kensington, Pa.

Humidifying Apparatus.
American Air Moistening Co., Boston.

Hydro Extractors.
American Tool & Machine Co , Boston.

Ink, Stamping.
Witmer, D. L, & Bro, 5th St. and Germantown Ave, Philadelphia.

Jacquard Card Boards.
Griffiths, Frank & Co., 2766 Ruth St., Phila.

Knit Goods Edgings, Trimmings, etc.
Cathcart, John & Co., 115 Franklin St., New York.
Cheney Bros, Silk Goods, 479 Broome St, N. Y.
Friedberger & Co, Edgings, Germantown Phila, Pa.
Hepner & Horwitz, Lacings, 30 Howard St, N. Y.
Krout & Fite Mfg. Co, Allegheny Ave. and Emerald St., Phila.
Weimar Bros, 1817 East York St, Phila. Pa.

Knit Goods Finishing Machines, Crochet, Etc.
Excelsior Sewing Machine Co, 120 N. 7th St, Phila, Pa.
Merrow Machine Co, The, Hartford, Conn.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 2079 E. Cumberland St, Phila Pa.

Knitting Machine Cylinders.
Paxton & O'Neill, 129 Bread St, Phila, Pa.
Stafford & Holt, Little Falls, N. Y.

Knitting Machinery.
Beattie Machine Works, Cohoes, N. Y.
Branson Machine Co., 506 John St., Philadelphia.
Campbell & Clute, Cohoes, N. Y.
Cooper, Chas, Bennington, Vt.
Crane Mfg. Co, Lakeport, N. H.
Excelsior Knitting Machine Manufacturing Co., Allentown, Pa.
Hepworth & Co, Lehigh Ave. and Mascher St, Phila, Pa.
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Jones, Lewis, 60 1-2 and Media Sts, Philadelphia, Pa.
Kennedy, Thos. (Cutters, etc.), Cohoes, N. Y.
Leighton Machine Co, Manchester, N. H.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
McMichael & Wildman Mfg. Co, Norristown, Pa.
Mueller, A, 760 Lexington Ave, Brooklyn, N. Y.
Nye & Tredick, 606 Arch St, Phila, Pa.
Paxton & O'Neill, 127 Bread St, Phila, Pa.
Pepper Mfg. Co, Lakeport, N. H.
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White, A. Lowell, Mass.

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Cooper, Chas, Bennington, Vt.
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Crane Mfg. Co , Lakeport, N. H.
Dodge Needle Co., Manchester, N. H.
Ives, Loyal T, New Brunswick, N. J.
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Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
Treat, Orion, Manchester Green, Conn.
Wardwell Needle Co, Lakeport, N. H.

Laboratory Outfits.
Bullock & Crenshaw, 528 Arch St Phila, Pa

Lapping Machine Attachment.
W. J. Hurley, Kimesville, N. C.

Looms.
Draper Company, Hopedale, Mass.
Fairmount Machine Works, 22d and Wood Sts. Philadelphia.
Furbush, M. A, & Son Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St, Phila, Pa. (For wire.)
Kilburn, Lincoln & Co, Fall River, Mass.
Leigh, Evan A., 35 Mason Bldg., Boston.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Whitin Machine Works, Whitinsville, Ms,
Woonsocket Machine & Press Co, Woonsocket, R. I.

Lubricators.
Ameledema Oilless Bearing Co., Berkeley St , Wayne Junction, Philadelphia.
Dixon, Jos., Crucible Co, Jersey City, N. J.
Graphite Lubricating Co., Bound Brook, N. J.

Lumber.
Stearns, A. T, Lumber Co, Neponset, Mass.

Lumpers.
Gerry, George, & Son, Athol, Mass.

Machinery Dealers.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.

Machinery Wipers.
American Silk Mfg. Co., Philadelphia.

Machinists' Tools.
Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E. Co, New London, Conn.

Mails.
Walder, J. Paterson, N. J.

Measuring and Folding Machines.
Curtis & Marble Machine Co, Worcester, Ms.
Elliott & Hall, 54½ Hermon St, Worcester Mass.

Mercerizing Machinery.
Butterworth, H. W. & Sons, Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.

Mills For Sale.
Denny, R. B., 143 Federal St., Boston.

Mill Builders and Engineers.
Berlin Iron Bridge Co, The, East Berlin, Ct
Ferguson, John W, Paterson, N. J.

Mill Supplies.
American Supply Co, Providence, R. I.
Bamford & Smith, Pascoag, R. I.
Bristol, The, Co., Waterbury, Conn.
Buckley's, Benj. Son, Gun Mill, Paterson, N. J.
Dixon Lubricating Saddle Co., Bristol, R.I.
Easton-Burnham Co., Pawtucket, R. I.
Frost, Geo. T., Paterson, N. J.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Mitchell-Bissell Co., 170 Summer St., Boston.
Thurston, A. G, & Son, Fall River, Mass.
Watson, L. S, Mfg.Co, Leicester, Mass.

Napping Machines.
American Napping Machine Co, Williamstown, Mass
Ardrey, S. B, & Sons, Bristol, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Jones, Lewis, 60 1-2 and Media Sts., Philadelphia, Pa.

Noils (Silk.)
See Novelty Yarns, Tinsels, Silk Noils, etc.

Pantagraphs for Mill Engraving.
Johnson, C. A, & Co, 22 Dey St, New York.

Patterns of European Novelties.
European Pattern Supply Co., 330 Broadway, N. Y.
European Textile Sample Co., 56 Worth St., New York.

Patent Solicitors.
Crosby & Gregory, 24 School St, Boston, Mass.
Siggers, E. G., Washington, D. C.
Wright, Brown & Quinby, 53 State St, Boston, Mass.

Perforated Metal.
Beckley, A. J. & Co., Garwood, N. J.
Harrington & King Perforating Co., 230 North Union St, Chicago. Ill.

Peroxide of Sodium.
Roessler & Hasslacher Chemical Co., 100 William St, New York.

Picker Sticks.
La Bar, L. T., Beateyestown, N J.
Loom Picker Co., Biddeford, Me.

Picking, Carbonizing and Garnetting.
Garfield Woolen Co, Garfield, N. J.

Pipe Covering (Magnesia).
Keasby, R. A. 83 Warren St, New York.
Norristown Covering Co., Ltd., Norristown, Pa.

Pneumatic Conveying.
See Ventilating.

Porcelain Guides.
Mitchell-Bissell Co., 170 Summer St., Boston.

Power Transmitting Machinery.
Ameledema Oiliess Bearing Co, 149 West Berkley St, Wayne Junction, Pa.
Channon, H, Co, 25 Market St, Chicago, Ill.
Christiana Machine Co., Christiana, Pa.
Eastern Machinery Co, New Haven, Conn.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunter, Jas, Machine Co, No. Adams, Mass.
Kilburn, Lincoln & Co, Fall River, Mass.
Link Belt Machinery Co, Chicago, Ill.
Saginaw Manufacturing Co., Saginaw, Mich.
Wall, William F. Rope Company, 56 South St., New York.

Presses.
Boomer & Boschet Press Co., 338 West Water St., Syracuse, N. Y.
Butterworth, H. W. & Sons Co., Philadelphia
Crawford, J. J, & Son, Nashua, N. H. (Power Screw, Hydraulic, Hollow Steam Plate.)
Curtis & Marble Machine Co, Worcester, Ms.
Hart, Charles, Frankford, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Phillips Co, The Thomas, Providence, R. I.
Sullivan Machinery Co., Claremont, N. H.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Pressing Irons, Gas and Air Heated.
Edwards Sad Iron Co, 1420 Chestnut St., Philadelphia.

Printers and Embossers.
Novelty Textile Printing Co, 447-449 W. 14th St, New York.

Pulleys.
See Power Transmitting Machinery.

Pumps.
Goulds Mfg. Co, Seneca Falls, N. Y.

Quills.
Parker, Henry, Co., Springfield, Vt.

Reed and Harness Manufacturers.
American Supply Co, Providence, R. I.
Walder, J, Paterson, N. J.

Ribbons.
Cheney Bros, S. Manchester, Ct.

Roofing, Gravel, Slag and Composition.
Armitage Mfg. Co, Richmond, Va.
Eastern Granite Roofing Co., Jersey City N. J.

Roofing, Paint and Paper.
Armitage Mfg. Co, Richmond, Va.
Billman, C. W. Philadelphia.

Roving Cans and Sheet Metal Work for Mills.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.
Sullivan Machinery Co, Claremont, N. H.
Walrus Fibre Mfg. Co., Medford, Mass.

Rubber Squeeze Rolls.
Clark, Geo. P. Windsor Locks, Conn.

Saddles and Stirrups.
Dixon Lubricating Saddle Co., Bristol, R. I.

Schools.
American Correspondence School of Textile, New Bedford, Mass
Lowell Textile School, Lowell, Mass.
New Bedford Textile School, New Bedford, Mass.
Philadelphia Textile School, Phila, Pa.

Screens (Perforated.)
See under Perforated Metal.

Sewing Machines and Supplies.
Birch Bros., Somerville, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Frame, Gibbons, 2nd and Diamond Sts, Phila, Pa.
Manufacturers' Supplies Co, 66 No. 4th St., Philadelphia.
Nye & Tredick, 606 Arch St, Phila, Pa.
Standard Sewing Machine Co, Cleveland, Ohio.
Scott & Williams, 6th and Arch Sts, Phila, Pa.
Union Button Sewing Machine Co., 164 High St., Boston, Mass.

Shearing Machinery.
See Dyeing, Drying, Bleaching and Finishing.

Shell Rolls.
Cohoes Foundry & Mach. Co, Cohoes, N. Y.
Thurston, A. G, & Son, Box 528, Fall River, Mass.

Shoddies.
See Wool Shoddies.

Shuttles.
See Bobbins, Spools, Shuttles, Etc.

Shuttle Eyes.
Mitchell-Bissell Co., 170 Summer Street, Boston

Silk (Tussah.)
Cornelis, Chailly & Co., 339 East 107 St, New York.

Silk Machinery.
Butterworth, H. W. Sons Co, Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
Mason Machine Works, Taunton, Mass.

Singe Plates.
Butterworth, H. W. Sons Co., Philadelphia.
New Bedford Copper Co, New Bedford, Mass

Sizing, Starch and Gums.
Quaker City Chemical Co., Wayne Junction, Philadelphia
Stein, Hirsch & Co, 165 Duane St, New York.

Slashers.
Cohoes Foundry & Machine Co, Cohoes, N. Y.
Lowell M chine Shop, Lowell, Mass.
Phillips C The Thomas, Providence, R. I.

Soaps.
Holbrook Manufacturing Co., New York.
India Alkali Works, Boston, Mass.

Spindles.
Bamford & Smith, Pascoag, R. I.
Buckley, Benj's, Sons, Gun Mill, Paterson, N. J.
Draper Company, Hopedale, Mass.
Easton-Burnham Co., Pawtucket, R. I.
Ward & Vandegrift, Elmer, N. J.
Whitin Machine Wks, Whitinsville, Mass.

Spindle Hook Bands.
Geo. T. Frost, Paterson, N. J.

Spindle Tubes.
Bamford & Smith, Pascoag, R. I.

Spinning Cylinders.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Spinning Frames.
See Cotton Machinery.

Spinning Frames for Wool
Woonsocket Machine and Press Co., Woonsocket, R. I.

Spinning Rings.
Draper Company, Hopedale, Mass
Morley Button Mfg. Co., Boston, Mass.
Whitinsville Spinning Ring Co, Whitinsville, Mass.

Spinning Tubes.
Buckley, Benj's. Son, Gun Mill, Paterson, N. J.

Spools. *See Bobbins, Spools Shuttles, Etc.*

Steam Boilers.
Brown, C. H, & Co, Fitchburg, Mass.
Lee-Odlum Co., Memphis, Tenn.

Steam Boiler Compound.
Straus & Co., 55 Broad St., New York.

Steam Boiler Insurance.
Hartford Steam Boiler Inspection & Insurance Co, Hartford, Conn.

Steam Engines.
Brown, C. H, & Co, Fitchburg, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Hooven (The), Owens & Rentschler Co, Hamilton, O.
Sturtevant, B. F. & Co., Boston.

Steam Specialties.
Butterworth, H. W. Sons Co., Philadelphia.

Tanks, Tubs and Vats.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Corcoran, A. J, 11 John St, New York.
Cypress Lumber Co, Apalachicola, Fla.
Lee-Odlum Co., Memphis, Tenn.
Stearns, A. T, Lumber Co, Neponset, Mass.
Vaughn Machine Co., Peabody, Mass.
Woolford, George, 2340 No. 9th St, Phila, Pa.

Tapes, Braids and Edgings.
Cathcart, John, & Co, 115 Franklin St, N. Y.
Fleming & Chapin, 229 Church St., Phila.
Friedberger Mfg. Co, Germantown, Pa.
Hamilton, J. H , & Co, 275 Church St, N. Y.
Krout & Fite Mfg. Co., Allegheny Ave. and Emerald St., Philadelphia.
Weimar Bros, 1817 East York St, Phila, Pa.
Young, Wm. M, 3638-40 Frankford Ave, Philadelphia, Pa.

Telephones.
Mianus Electric Co., Mianus, Conn.
Plummer, F. O. 620 Atlantic Ave., Boston.

Tentering Machines.
See Dyeing, Bleaching Machinery, Etc.

Tension Pulleys.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Testing Machines.
Howard, Geo. C., 1783 Barker St., Phila., Pa

Towers.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Lee-Odlum Co., Memphis, Tenn.

Trucks.
Armstrong Truck Co., Philadelphia.

Turbines.
(See Water Wheels.

Ventilating Apparatus.
Allington & Curtis Mfg. Co , Saginaw, Mich., and East Cambridge, Mass
American Air Moistening Co., Boston.
Berger Bros. Co., 231-237 Arch St., Philadelphia.
Berry, A. Hun, 23 W. 1st St, Boston, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Mattern, Geo. 44 East 8th St., New York.
New England Ventilating & Heating Co, Providence, R. I.
Philadelphia Drying Machinery Co., 6731 Germantown Ave., Philapelphia.
Philadelphia Textile Machinery Co, Hancock St, above Lehigh Ave, Phila, Pa.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Washers (Cloth).
Birch Brothers, Somerville, Mass.
Butterworth, H. W. & Sons Co., Philadelphia.
Hopkins, Machine Works, Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Phillips Co, The Thomas, Providence, R. I.

Waste Unraveller.
Whiteford, R. A. P. Philadelphia.

Watchman's Clock.
Eco Magneto Clock Co, 620 Atlantic Ave, Boston.
Nanz & Co, 127 Duane St., New York.

Water Wheels.
Bradway, C. P., W. Stafford, Ct.
Christiana Machine Co., Christiana, Pa.
Hunt, Rodney, Machine Co, Orange, Mass.
Leffel, James, & Co, Springfield, O.

Water Wheel Governors.
Bradway, C. P, West Stafford, Ct.
Cohoes Foundry & Machine Co, Cohoes N. Y.
Leffel, James & Co, Springfield, Ohio.
Lombard Water Wheel Governor Co, 61 Hampshire St, Boston.

Winders. (Hosiery.)
Universal Winding Co, 226 Devonshire St, Boston.

Wood Pulleys.
Saginaw Manufacturing Co, Saginaw, Mich.

Wool Cleaning Compound.
India Alkali Works, Boston.

Wool Combing Machinery.
Leigh, Evan A. 35 Mason Bldg., Boston.

Wool Extracts.
Garfield Woolen Co, Garfield, N. J.

Wool and Waste Dusters.
Gerry, Geo, & Son, Athol, Mass.
Sargents', C. G., Sons, Graniteville, Mass.
Stillman-Randall Machine Co, Westerly, R. I.

Woolen and Worsted Machinery.
Altemus, W. W, & Co, 2216 N. 4th St, Phila Pa.
American Tool and Machine Co., Boston.
Birch Brothers, Somerville, Mass.
Butterworth, H. W. Sons Co., Philadelphia.
Cobb, Thad. S., Machinery Co., Lowell, Mass.
Curtis & Marble Machine Co, Worcester, Mass
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A. & Son Machine Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Kenyon D. R. & Son, Raritan, N. J.
Leigh, Evan A. 35 Mason Bldg, Boston.
Philadelphia Drying Machinery Co., 6731

Germantown Ave., Philadelphia.
Philadelphia Textile Machinery Co., Hancock and Somerset Sts., Philadelphia.
Phillips Co The Thomas, Providence, R. I.
Sargent's, C. G., Sons, Graniteville, Mass
Stoddard, Haserick, Richards & Co, Boston, Mass.
Woonsocket Machine & Press Co Woonsocket, R. I.

Wool, Hair and Noils.

Becker, Chas. W, Agt, Amsterdam, N. Y.
Fowles & Co, 106 Church St, Phila.

Wool Shoddies.

Becker, Chas. W, Agt, Amsterdam, N. Y
Garfield Woolen Co, Garfield, N. J.
Slack, Wm. H. B., & Bro, Springfield, Vt.

Wool Sorters, Scourers and Carbonizers.

Morse Wool Treating Co., Norton, Mass.

Wool Washing, Preparing and Drying Machinery.

Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.

Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G, Sons, Graniteville, Mass.

Woolen Commission Merchants.

Dusenberry, C. Coles, 396 Broadway, New York.

Hayes, O. H. & Co., New York.

Yarns, Threads, Etc.

Banding.

Frost Geo. T, Paterson, N. J.
Moore, C. & Co. 12 S. 5th St, Phila, Pa.
Warren, W, Thread Works, Westfield, Mass.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.
Tucker & Cook Mfg. Co, Conway, Mass.
Whittier Cotton Mills, Lowell, Mass.

Cotton Yarns.

American Cotton Yarn Exchange, 45 Milk St., Boston.
Catlin & Co, New York and Boston.
Clark, Wm. Co, Westerly, R. I.
Cohannet Mills, Taunton, Mass.
Eddy & Street, Providence, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Fleming & Chapin, Philadelphia.
Germantown Spinning Co, Germantown, Pa.
Grant Yarn Co, Fitchburg, Mass.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hadley Co, Holyoke, Mass.
Indian Orchard Co., Indian Orchard, Mass.
Jenckes, E., Mfg. Co., Pawtucket, R. I.
Mitchell, Jas. E, & Co, Boston and Phila, Pa.
Montgomery, J. R, Co, Windsor Locks, Ct.
Monument Mills, Housatonic, Mass.
New England Thread Co., Pawtucket, R. I.
Orswell Mills, Fitchburg, Mass
Tucker & Cook Mfg. Co, Conway, Mass.
Whittier Cotton Mills, Lowell, Mass.

Gassed Yarns.

Greene & Daniels Mfg. Co, Pawtucket, R. I.

Glazed Yarns.

Eichmann & Sternberg, 530 Broadway, cor Spring St., N. Y.
Indian Orchard Co., Indian Orchard, Mass.
Lorimers, Wm. H. & Sons Co., Philadelphia.
Malcolm Mills Co, Frankford, Pa.
Meyer, John C. & Co, 87 Summer St., Boston.
Montgomery & Co, J. R, Windsor Locks, Ct.
New England Thread Co., Pawtucket, R. I.
Warren, W, Thread Works, Westfield, Mass
Whittier Cotton Mills, Lowell, Mass.

Harness Twines.

Cranston Worsted Mills, Bristol, R. I.
Fawcett, Hughes, 115 Franklin St., N. Y.
Hadley Co, 95 Milk St, Boston, Mass.
Moore, C, & Co., (S. W. cor. 5th and Market Sts.)
Warren, W, Thread Works, Westfield, Mass
Whittier Cotton Mills, Lowell, Mass.

Hosiery and Knitting Yarns.

Boyer, B. F, & Co, Camden, N. J.
Campbell, Geo, & Co, Phila, Pa.
Champlain Silk Mills, Whitehall, N. Y.
Clark, Wm. Co, Westerly, R. I.
Clasgens, The J. & H. Co, New Richmond, Ohio.

Cohannet Mills, Taunton, Mass.
Colchester Mills, 86-88 Franklin St, New York.
Cranston Worsted Mills, Bristol, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St, N. Y.
Germantown Spinning Co, Germantown, Pa.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
Jenckes, E. Manufacturing Co, Pawtucket, R. I.
Mitchell, James E, & Co, Phila. and Boston
Monument Mills, Housatonic, Mass.
Orswell Mills, Fitchburg, Mass.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Walcott & Campbell Spinning Co, New York Mills, Oneida Co, N. Y.
Warren, W, Thread Works, Westfield, Mass.
Whittier Cotton Mills, Lowell, Mass.

Flax, Hemp, Jute and Ramie.

Eichman & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Fawcett, Hughes, 115 Franklin St., N. Y

Mohair Yarns.

Cranston Worsted Mills, Bristol, R. I.
Eichmann & Sternberg, 530 Broadway, cor Spring St., N. Y.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Novelty Yarns, Tinsels, Silk Noils, Etc.

Champlain Silk Mills, Whitehall, N. Y.
Cranston Worsted Mills, Bristol, R. I
Eichmann & Sternberg, New York City.
Indian Orchard Co., Indian Orchard, Mass.
Malcolm Mills Co, 229 Chestnut St, Phila, Pa.
Montgomery & Co, J. R, Windsor Locks, Ct.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Silk Yarns.

Champlain Silk Mills, Whitehall, N. Y.
Cheney Bros, S. Manchester and Hartford Ct.
Eddy & Street, Providence, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Meyer, John C, & Co., 87 Summer St., Boston.
Ryle, Wm, & Co, 54 Howard St, N. Y.

Woolen and Merino Yarns.

Boyer, B. F, & Co, Camden, N. J.
Clasgens, The J. & H. Co, New Richmond Ohio.
Eddy & Street, Providence, R. I.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
Jenckes, E. Mfg. Co., Pawtucket, R. I.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.

Worsted Yarns.

Alleghany Worsted Mills, Phila, Pa.
Boyer, B. F, & Co, Camden, N. J.
Campbell, Geo. & Co, Phila, Pa
Campion, Richard, 17 Bank St., Philadelphia.
Cranston Worsted Mills, Bristol, R. I.
Croft, Howland, & Sons, cor. Broadway and Jefferson Ave., Camden, N. J.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Elsasser, Albert R, Addingham, Pa.
Goff, D. & Sons, Pawtucket, R. I.
Herbst & Jones, 21st and Naudain Sts Philadelphia, Pa.
Pocasset Worsted Co., Thornton, R. I.
Skerry, A. T, & Co, 47 Leonard st, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.
Waverly Worsted Co, Main St. and Green Lane, Manayunk, Pa.

Alphabetical Index to Advertisements.

page

Adriance, John S. Outside Back Cover.
Albany Belting & Supply Co. . . . 188
Alexander Bros., ... 186
Allegheny Worsted Mills . . . 154
Allington & Curtis . Outside Back Cover
Altemus, W. W. & Son, ... 12
Ameledema Oilless Bearing Co, . . 192
Amend Process Co 163
American Aniline Co., ... 164
American Correspondence School of Textiles, ... 19
American Cotton Yarn Exchange . . 158
American Moistening Co. 150
American Napping Machine Co., . . 172
American Silk Mfg. Co., ... 190
American Supply Co., ... 13
American Tool and Machine Company 170
American Yarn Printing Works . . 166
Anchor Color Mfg. Co, ... 164
Ardrey, S. B, & Sons, ... 184
Armitage Manufacturing Co, . . . 190
Armstrong Truck Co 188
Ashworth, Elijah, ... 13
Atteaux, F. E. & Co. 158
Bailey, Frank 172
Bamford & Smith, ... 172
Beattie Mch. Works 181
Becker, Chas. W. . . . . —
Beckley, A. J & Co. 191
Berger Bros. Co, ... 186
Berlin Antiline Works, ... 162
Berlin Iron Bridge Co 140
Berry, A. Hun, ... 168
Billman, C. W. 191
Birch Bros. 167-14
Bischoff, C., & Co., ... 161
Blaisdell, P., & Co., ... 187
Boomer & Boschert Press Co. . . . 146
Bosson & Lane, ... 164
Boyer, B. F, & Co, ... 153
Bradway, C. P, ... 189
Branson Machine Co, ... 176
Breedon, Wm., & Son, ... 183
Bristol Co., The . Outside Back Cover.
Brophy's, T, Sons 158
Brown, C. H, & Co, ... 186
Brown, W. H, ... 14
Buckley's Benj, Son, ... 190
Buffalo Forge Co. 128
Burkhard, Thomas. 166
Burr Bobbin Holder & Thread Catcher Co , ... 14
Butterworth H. W. & Sons Co., . . 1
Caldwell, W. E Co. 166
Calmore & Co. 184
Campbell, Geo, & Co, ... 154
Campbell & Clute, ... 182
Campion, Richard, ... 151
Cathcart, John & Co. 183
Catlin & Co, ... 149
Channon, H, Co. 16
Cheney Bros, ... 156
Christiana Machine Co. 189
Clark, The William. Co,. 172
Clark, Geo. P. 170
Clasgens, The J. & H. Co, ... 151
Cling Surface Co. 128
Cohannet Mills, ... 149
Cohoes Dye Works 157
Cohoes Foundry & Machine Co., . . 14
Cooper, Chas, ... 184
Corcoran, A. J, ... 166
Corey, S. J., ... 164
Corey, Wm., Co., ... 183
Cornelis, Chailly & Co., ... 153
Crabb, Wm, & Co, ... 14
Crane Mfg. Co., ... 183
Cranston Worsted Mills, ... 154
Crawford, J. J. & Son., ... —
Croft, Howland, Sons & Co, . . . 154
Crosby & Gregory. 28
Curtis & Marble Machine Co., . . 172
Cypress Lumber Co, ... 165
Denny, R. B. 136
Dillon & Co, ... 164
Dixon, Jos., Crucible Co., . . . 191
Dixon Lubricating Saddle Co. . . 13

page.

Draper Company 3
Dodge Needle Co. . . . . —
Dusenbury, C. Coles & Son . . . 152
Eastern Granite Roofing Co. . . . 187
Easton-Burnham Co., ... 146
Eastern Machinery Co. 190
Eco Magneto Clock Co, ... 191
Eddy & Street, ... 151
Edwards Sad Iron Co., The . . . 136
Eichmann & Sternberg, ... 151
Elliot & Hall, ... 12
Elsasser, A. R. 151
European Pattern Supply Co. . . . 17
European Textile Sample Co., . . . 138
Excelsior Knitting Machine Mfg. Co, . 179
Excelsior Sewing Machine Co, . . . 183
Fairmount Machine Co, ... 8
Farbenfabriken of Elberfeld Company, 160
Fawcett, Hughes, ... 149
Ferguson, John W., . Outside Back Cover
Firth & Foster Co. 167
Fleming & Chapin 185
Frame, Gibbons, ... 184
Friedberger Mfg. Co. 178
Frost, Geo. T., ... 14
Furbush, M. A. & Son Machine Co, . . 24
Garfield Woolen Co., ... —
Geisenheimer & Co, Outside Back Cover.
Germantown Spinning Co., ... 148
Gerry, Geo. & Son, ... —
Goulds Mfg. Co, ... —
Granger Foundry & Machine Co., Inside Front Cover.
Grant Yarn Co., ... 149
Graphite Lubricating Co,. 188
Greene & Daniels Mfg. Co., . . . 152
Greenwood, R., & Bault, ... 157
Griffiths, Frank & Co., ... 17
Haedrich, E. M, ... 172
Hadley Co., ... 152
Haines, Wm. S. Co., ... 188
Hamilton, J. H. & Co. 184
Hammer, C. H. & Co., ... 17
Harrington & King Perforating Co. Outside Back Cover.
Hardy Machine Co., ... 168
Hart, Chas. . . . . —
Hartford Steam Boiler Inspection & Insurance Co., ... 188
Hayes, O. H. & Co 152
Hepner & Horwitz, ... 184
Hepworth, John W, & Co, ... 181
Herbst & Jones, ... 151
Home Bleach & Dye Works, ... 157
Hopkins Mch. Works, ... 170
Hooven, Owens & Rentschler Co, . . —
Howard, Geo. C., ... 190-11
Howard & Bullough Am. Machine Co., . 5
Hunter, Jas, Machine Co, ... 171
Hunt, Rodney, Machine Co, ... 169
Hurley, W. J. 13
Hyde, Edward S., ... 146
India Alkali Works, ... 167
Indian Orchard Co. 150
Ives, Loyal T 183
Jaeck, The, Bros Co., ... 164
Janney, O. S., & Co., ... 161
Jefferson, Edw, & Bro., ... 139
Jenckes, E., Mfg. Co., ... 174-149
Johnson, Chas. A., & Co., ... 170
Johnson, Wm. G, & Co. 163
Jones, Lewis 184
Keliher, Wm., ... 14
Keller, John J., & Co., ... 159
Kelley, Benj. F. & Son, ... —
Kenyon, D. R. & Son, ... 170
Kennedy, Thos. 181
Kilburn, Lincoln & Co., ... 12
Kilpatrin, A, & Co., Outside Back Cover.—163
Koechl, Victor, & Co 188
Kront & Fite Mfg. Co., ... 183
La Bar, L. T. 185
Lee-Odlum Boiler Co., ... 188
Leffel, James, & Co 189
Leigh, Evan Arthur, ... 12
Leighton Mch. Co., ... 179
Lincoln, The, Co. 167

	page
Link Belt Machinery Co.,	15
Littlewood, G. J, & Sons	156
Lombard Water Wheel Governor Co.,	—
Loom Picker Co.,	—
Lorimers, Wm. H. Sons Co.,	137
Lowell Machine Shop,	2
Lowell Textile School,	19
Lydall, H., & Foulds,	183
Lynn Incandescent Lamp Co.,	181
Magnesia, Outside Back Cover	
Malcolm Mills Co.,	154
Manufacturers' Supplies Co.	183
Mason Machine Wks.,	7
Matheson, & Co., Wm. J.,	160
Mattern, Geo.	168
Mayo Knitting Machine & Needle Co,	180
McKerrow, H. G.	10
McMichael & Wildman Mfg. Co,	180
Merrimac Chemical Co,	—
Merrow Machine Co.,	182
Meyer, John C. & Co.	183
Mianus Elec. Co.,	191
Mitchell-Bissell Co.	139
Mitchell Jas. E., & Co.,	149
Molt Bros.	165
Montgomery, J. R., Co.,	153
Monument Mills,	182
Moore, C., & Co.,	151
Moore, Benjamin & Co.,	191
Morley Button Mfg. Co.,	11
Morse Wool Treating Co, The	173
Mueller, A,	181
Nanz & Co,	17
Nashua Spool and Bobbin Co,	17
National Ring Traveler Co., The	11
New Bedford Copper Co.,	167
New Bedford Textile School,	19
New England Thread Co.,	155
New England Butt Co.,	185
New England Ventilating & Heating Co.,	168
N. Y. & Boston Dyewood Co,	163
Norristown Covering Co., Ltd.	187
Novelty Dye Works,	156
Novelty Textile Printing Co,	184
Nye & Tredick,	175
Oakes Mfg. Co,	158
Orianna Bleach Works,	158
Orswell Mills,	150
Palmetto Co., The,	164
Parker, Henry Co.,	17
Pawtucket Dyeing & Bleaching Co.	157
Paxton & O'Neill,	182
Pearson, J. T.,	183
Peel, Sam'l H.	185
Pepper Mig. Co.,	179
Phenix Iron Foundry,	167
Philadelphia Drying Machinery Co.	8
Philadelphia Textile Machinery Co.,	9-168
Philadelphia Textile School,	19
Phillips, The Thomas, Co,	192
Pickhardt & Kuttroff,	22
Plainfield Foundry Co.,	183
Plummer, F. O	191
Pocasset Wstd. Co.,	146
Popham, Henry & Son	186
Quaker City Chemical Company	17
Quilter, James H,	18
Richman & Foley,	17
Riggs & Co.,	139
Roessler & Hasslacher Chemical Co,	161
Rowland, Sam'l	182
Rusden Mch. Co.,	20
Ryle, William, & Co.,	156
Saginaw Mfg. Co.	190
Sargent's, C. G., Sons,	—
Scott & Williams	177
Sharpless Dyewood Extract Co.,	165
Sigger, E. G.	23
Skerry, A. T, & Co,	155
Slack, Wm. H. H. & Bro.	185
Solis, Andrew J. Jr., & Co.,	155
Stafford & Holt,	182
Stamford Mfg. Co.,	162
Standard Sewing Mch. Co, The	177
Stearns, A. T, Lumber Co,	165
Stein, Hirsch & Co.,	17
Stillman-Randall Machine Co.,	165
Stoddard, Haserick, Richards & Co,	8
Stone & Ware Co,	158
Straus & Co.	186
Stuart & Audel,	187
Sturtevant, B. F. Co., Inside Back Cover	
Sullivan Machinery Co,	187
Sykes & Street,	162
Tebbetts, E. L. & Co., Outside Back Cover	
Thun & Janssen	182
Thurston, A. G. & Son,	—
Torrance Mfg. Co	170
Tower & Wallace,	185
Treat, Orion,	184
Tucker & Cook Mfg. Co.,	149
Union Button Sewing Machine Co.	175
Universal Winding Co.,	148
Vaughn Mch. Co.,	166
Walcott & Campbell Spinning Co,	149
Walder, J.,	17
Wall, Wm. F., Rope Co.	192
Walrus Fibre Mfg Co.,	11
Ward & Vandegrift,	12
Wardwell Needle Co.,	183
Warren, W., Thread Works,	148
Watson, L. S, Mfg. Co,	12
Waverly Worsted Co,	151
Weihe, H. C.	167
Weimar Bros,	185
Whitcomb, H. C, & Co,	18
White, A.	18
Whitin Machine Works,	4
Whitinsville Spinning Ring Co.,	11
Whiton D. E. Machine Co.,	187
Whittier Cotton Mills,	150
Witmer, D. L, & Bro,	183
Whitney & Kemmerer,	190
Woolford, George,	166
Woonsocket Machine & Press Co,	6
Wright, Brown & Quinby,	23
Young, Wm. M,	184

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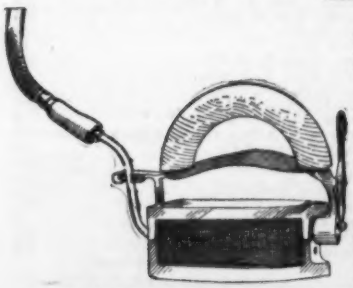

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TEXTILE BOOKS.

The following are recent publications, which we will furnish upon receipt of their price.

Plain Series of Cotton Spinning Calculations, by William H. Cook, 91 pages.

This book gives original calculations relating to cotton spinning, giving the position of the different pulleys and wheels, which are taken into consideration when making calculations; and also points where the necessary changes are made when altering from one count to another. Price $1.

Sizing Ingredients, Size Mixing and Sizing. By Hugh Monie, Jr., 63 pages, Illustrated.

This book is intended to be a complete practical work dealing with everything relating to the modern processes of sizing, and takes up such subjects as sizing ingredients (flours, softeners, deliquescent substances); Size preparations (Chloride of Zinc, Whitening material, Percentage of size, etc.); Fermentation; Mixing; Construction of Sizing Machine; Working of the Machine; Definition of Technical Terms; Calculation, etc. Price $1.00.

Ornamental Design for Woven Fabrics, by Stephenson & Suddards. 273 pages, 66 illustrations.

This is a text book dealing with ornamental design for woven fabrics, for the use of the student, and has been written for the purpose of suggesting helpful ideas to designers and manufacturers of textiles, and aims at bringing artistic textile work into practical touch and closer relationship with the technical requirements of manufacturing. It takes up such subjects as Geometric Design; How to Plan an All-over Repeating Design; The Drop Pattern; The Sateen Arrangements; Borders, Corners, Stripes; The Structure of Ornamental Flowers, Foliage, etc. Price $2.50.

Cotton Spinning. By W. S. Taggart Three volumes. Price $7.50.

This work treats of the subject in an exhaustive way, from the first operations in the picking, to the last in the spinning department. The various parts of the subject have been treated in such a manner that the young student may greatly benefit himself and use it as a text-book, while the older readers will find in them much of interest, in satisfying a desire for a fuller knowledge and a more perfect grasp of the principles underlying many of the processes in much of the mechanism of cotton spinning machinery. A spinner can make no mistake in procuring this work.

The Student's Cotton Spinning, by Joseph Nasmith.

This is a standard book on spinning. It treats of mixing, opening, scutching, carding, card clothing, combing, roving, spinning, reeling, waste spinning, etc. 493 pages. Price $3.00.

Cotton Weaving and Designing, by John R. Taylor, 288 pages, fully illustrated.

This work is by a well known writer and lecturer on this subject, and treats of such topics as: Hand and Power Looms; Drop and Circular Box Looms; Dobbies; Jacquard and Leno Weaving; Terry Looms; Principles of Designing, Plain and Figured; and Textile Calculations. This work is of much value. Price $2.50.

Woolen Spinning, by Charles Vickerman.

This is a most excellent work for students in textile schools, and for skillful, practical men in woolen mills. It takes up the principles that underlie the various processes and operations of the earlier parts of manufacture. It has chapters devoted to Wool; Wool Sorting; Scouring; Bleaching; Mixing, etc., Carding and Spinning. 352 pages. Price $1.75.

Jacquard Weaving and Designing, by T. F. Bell. 300 pages. Fully illustrated.

The contents of this work have been derived from a long course of art and technical training, together with a lengthy practical experience in textile manufacturing and designing, by the author. The descriptions are as concise as is compatible with fairly clear explanation. Price $4.00.

The Mechanism of Weaving, by T. W Fox.

A treatise of 464 pages, presenting exact and practical information upon the principles of weaving. Takes up such topics as Harnesses; Shedding; Dobbies; Jacquards; Card Cutting; Picking; Pickers; Swivel Weaving; Beating Up; The Reed; Taking-up Motion; Temples; Trimming and Fixing of Parts. 256 illustrations. Price $2.50.

Manual of Dyeing, by Knecht, Rawson and Loewenthal. In three volumes.

Decidedly the best work of the kind for a proper understanding of the present state of the art of dyeing, for the use of practical dyers, manufacturers and students. It takes up such subjects as, Water; Acids; Alkalies; Mordants; Natural and Artificial Coloring Matter; Machinery used for dyeing, etc. Has numerous illustrations and specimens of dyed fabrics. Price $15.00.

Draw Frames and Fly Frames. By Thomas Thornley, 380 pages.

This is the only work especially devoted to the drawing and roving processes, and is intended to benefit those who are directly concerned in the practical operation of the machines under discussion, with particular stress on the points which will give the best results from machines in their actual manipulation. Among the subjects treated may be mentioned the following: Drawing Frames; Fly Frames—Winding, Building Motion, Differential Motions; Roller Setting and Drawing; Defective Roving Bobbins; How to Put up Frames; etc. Price, $3.00.

Cotton. By Christopher P. Brooks, 384 pages, 174 illustrations.

This is the most acceptable book on this subject that has been published. The subject has been presented in a remarkably attractive style, and is treated in a manner not to be found elsewhere. Cotton is considered in its botanical features, its cultivation, preparation for the market, and as an article of commerce. A full chapter is given on the commercial uses of the seed for oil, etc. It is a volume that will be of interest to the cotton factor, merchant, broker, and all whose business it is to buy or sell the fibre in its raw or manufactured condition. We cannot speak in too flattering praise regarding the merits of this book. Price $3.00.

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Cotton Superintendent Wanted.

A practical and experienced man who can lay out the necessary machinery for a new cotton mill with about 30,000 spindles. Address in confidence, E. L. D., care of TEXTILE WORLD.

To sound industries substantial inducements will be given by many of the places concisely described in the pamphlet "100 Cities and Towns Wanting Industries." Write for a copy. Nearly all kinds of industries are wanted. Very liberal inducements are offered **Textile Industries** in the South by a number of good places. GEORGE C. POWER, Industrial Commissioner I. C. R. R. Co., Chicago.

European Textile Sample Co.

Foreign Textile Fabrics for Designs.

56 Worth St., - NEW YORK.

—*Connecticut, North Grosvenordale. The Grosvenordale Co. denies the report that further enlargement of their plant is contemplated at present.

—Illinois, Peoria. The Peoria Cordage Co. has increased its capital stock from $200,000 to $400,000.

—Maine, North Dexter. The Dews Woolen Co. has taken another lease of the woolen mill here, it having been successful in the conduct of the plant during its recent lease.

—Massachusetts, Boston. A consolidation of the narrow fabric manufacturers is talked of, and we understand that several meetings of interested parties have been held in Boston. Lee, Higginson & Co. are mentioned as the financiers of the new combination.

—Massachusetts, Fall River. The American Woolen Co. has offered the real estate and mill of the Jesse Eddy Mfg. Co. to the Union Mfg. Co. for $75,000, but it has not been announced what action the latter company will take regarding purchase.

—*Massachusetts, Fall River. The Bourne Mill is considering Warren, R. I., as a site for its new mill. This town offers to exempt the plant from taxation for a period of ten years.

—Massachusetts, Franklin. The American Woolen Co. has sold its North Bellingham mill, formerly known as the Ray Woolen Mills. It is understood that a local company will be formed to operate the plant, which formerly made union cassimeres, overcoatings, etc.

—Massachusetts, Leominster. It is now reported that J. E. Fenner, who has been endeavoring to get his Warp Knitting Mill started at Spencer, will move his machinery to Leominster.

—Massachusetts, Uxbridge. A meeting of woolen manufacturers in this vicinity was held October 25th, and it is reported that some consolidation or working agreement has been decided upon. Those present at the meeting were: William E. Hayward, Harry Hayward and Edgar Murdock of Uxbridge, Manager Schuster and Walter Schuster of East Douglas and L. H. Taft of Brookline.

—New York, Rossman's. The Rossman Knitting Co. has been incorporated with $65,000 capital by Leonard J. Rossman, Edgar J. Rossman of Rossman's; Benjamin F. Haigh, Stockport Center; Matthew Connor, Stuyvesant Falls; Ernest L. Camburn, Rossman's.

—North Carolina, Concord. The Lippard Yarn Mill is the name recently adopted by the Lippard & Shealy Mfg. Co., which is the new plant started up about a year ago with 4000 spindles. Capital, $50,000. J. E. Sherrill has been elected secretary and treasurer in place of J. C. Lippard, who has resigned.

—Pennsylvania, Philadelphia. A meeting of knitting manufacturers in the vicinity of Schuylkill Haven resulted in the organization of the American Manufacturers' Protective Association. President, J. F. Bast; secretary, E. L. Thomas; treasurer, Harrison Berger.

—Pennsylvania, Philadelphia. The Franklin Silk Mills, Ltd., have made an assignment for the benefit of creditors to Conrad B. Day.

—Rhode Island, Woonsocket. There is a report that the Centredale (R. I.) Worsted Co. has made an offer of $70,000 for the property of the American Worsted Co., now idle and in the hands of a receiver. This company recently purchased the Stillwater Mill, which it is putting in shape for making worsted yarns.

—*West Virginia, Keyser. Arnold C. Scherr, proprietor of the Keyser Woolen Mills, informs us that the recent report regarding a new company is not true, nor is he enlarging his own plant.

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One set of 60-inch Cleveland Cards.
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One Dobbins Steam Screw Power Press (16 hollow plates.)

Several hundred Payne Cone Winder Bobbins. Sturtevant Fan.

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Mrs. Gibson has consigned to us for sale all the original books of recipes with samples attached prepared and used by Richard Gibson, covering the entire period of his long career in the dyehouse as one of the foremost American dyers. Some of the recipes are doubtless very valuable. There are several large books and a number of smaller ones, papers, memoranda, etc. Mrs Gibson thinks she ought to get $100 for the lot. We think so too. The sample books, etc. may be examined at our office by interested parties. The entire amount goes to Mrs. Gibson. She informs us that there are no more copies of her husband's printed books to be had.

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A man who is thoroughly experienced in the manufactnre of hosiery, both cotton and wool, is open for an engagement with responsible parties. Address, F. F. N., care TEXTILE WORLD.

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One who thoroughly understands fixing machines and finishing hosiery. Good references. State age and salary expected. Address, Box 240, Athens, Ga.

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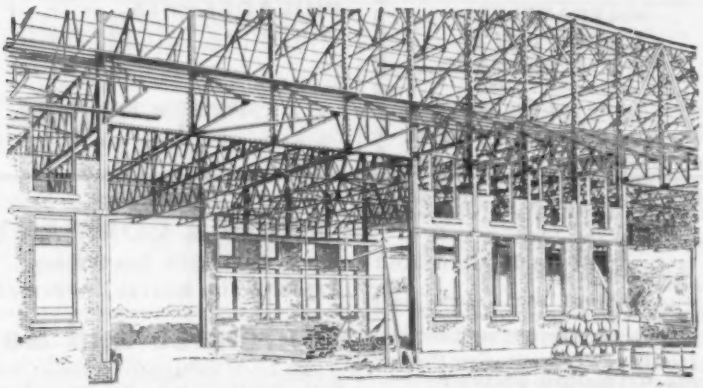

The above illustration is taken direct from a photograph made during the construction, and shows the details, of an Iron Building designed and built by us for The Newport News Ship Building and Dry Dock Co., at Newport News, Va. The building is 60 feet in width by 320 feet in length, and is two stories high—the lower floor being used as a Ship Shed for punching, bending, riveting, etc.—the upper floor being used as a Mold Loft. Outside of the building, extending entirely around it, on all four sides, is an overhang 12 feet wide, thus affording additional shop room outside of the building where raw material can be stored and still be protected from the weather. Wide openings are placed every 40 feet so that the raw material may be taken, and finished product taken out, cheaply and quickly. The supporting frame is all iron throughout, and between the iron posts on the sides is a light brick wall.

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SITUATIONS WANTED.

The advertisers in the following columns should be addressed in care of TEXTILE WORLD or inquiries concerning them may be addressed directly to "Information Department TEXTILE WORLD," as full particulars of each advertiser are on file, and the addresses of suitable agents, superintendents and foremen for every branch of the textile industry will be furnished to manufacturers.

Any subscriber may file his application, and no charge is made until position is secured.

The business of this department is held strictly confidential.

The applications of good overseers in every department, who are in want of positions, are solicited.

Manufacturers are invited to use this department when in need of skilled men; each case will be handled confidentially, with promptness and judgment, and without charge to manufacturers.

A member of the firm is in charge of this department, and gives personal attention to each case.

WOOLEN SUPERINTENDENTS.

1546 **Agent or Supt. Woolen Mill.** Age 33; married. 15 years' experience in Scotland and America in woolen trade. Cassimeres, Scotch cheviots and fancies and Irish friezes a specialty, both colors and make up. At present in position, but anxious to have full charge of 8 or 10 set mill. Best references.

935 **Woolen Supt. and Designer.** Graduate of German Textile School. Has managed successfully two mills in the West. Thoroughly up on designing and general mill management. Age 35. Married. References first-class.

1570 **Supt. or Designer** of small woolen mill. Practical experience in carding, dressing, finishing and designing departments, on fine and low grade cassimeres, blankets, jeans and low grade worsteds. Temperate, American, age 33. Fine record. Now out of work because of change in line of goods at mill where he has been working.

1349 **Woolen Supt. or designer.** Has been 12 years superintendent of 20 set mill in Conn., until recently, when he resigned on account of children's schooling. Has also been designer and pattern weaver. High character and first class ability. Age 39; American, married. Experience on worsteds, cassimeres, cheviots, ladies' fancy dress goods, etc.

1575 **Assistant Supt. Woolen.** A graduate of the Philadelphia Textile School (highest standing), and has had more than 7 years' experience in the various departments of a Massachusetts mill. Wants to get a start where there is fair chance of advancement. Age 28, single.

218 **Woolen Superintendent, Designer or Boss Weaver.** Age 35; American. Has worked on all classes of dress goods and men's wear. Can furnish good references and will accept a moderate salary.

1386 **Woolen Superintendent or Boss Carder.** Age 43; American. Familiar with the manufacture of all kinds of woolen goods, is well recommended, and can go immediately.

1606 **Woolen Supt.** 24 years' experience as supt. and manager. Several years manager of his own plant. At present out of position owing to consolidation. Would make a successful manager of a moderate sized plant, making plain or fancy cassimeres, doeskins or felt goods. Best of references.

1610 **Woolen Supt. or Dyer.** Large experience as dyer and assistant supt. on broadcloths, kerseys, dress goods and men's wear. Age 36; American, married.

COTTON SUPERINTENDENTS.

189 **Cotton Superintendent** wants position in Northern mill. Has been in charge of Southern mills for 7 years. Previous experience in N. E. Is well known among mill men, and can furnish the best of references. Age 36; married.

1390 **Cotton Superintendent.** Especially qualified for a mill making dress goods and fine shirtings. Experience with first-class mills as designer and manager. A young man of high character. At present employed.

1532 **Superintendent.** Has been in mill business all his life, and been with the present firm for a number of years, having been promoted several times. He wishes to better himself.

1306 Young American wants position as cotton superintendent. Experience mostly on cotton warps. Has been bookkeeper, overseer of carding and spinning; also superintendent in Massachusetts mills.

1486 **Superintendent** or will take a position as boss spinner in a large room. Age 43; American. Experienced mostly on plain goods. At present employed as overseer.

1464 **Superintendent of Fancy Cotton Weaving.** Age 43; married; an American. Will not work outside Northern and Eastern states. Has worked on fancy goods of all kinds, white and colored cottons, worsteds and silks. Is familiar with all makes of looms and dobby heads. Is at present employed, but wishes to better himself, if possible. Refers to present and past employers.

1453 **Superintendent** desires position in a cotton mill. Age 26; married; American. Has worked on prints, fine sateens, sheeting ginghams, duck, denims, cottonades, ticks, awnings and domets. Is familiar with all makes of spinning, spooling and warping machinery. At present employed, but wishes to obtain a more advanced position. Refers to present and past employers.

1624 **Cotton Supt.** A young man who has been through all departments of cotton cloth mill would like position as assistant supt. or in charge of a small mill, or would take a good boss spinning job. Very well recommended, and a young man of great promise.

1608 **Cotton Yarn Supt.** A man capable of taking charge of all departments of yarn mill. Would accept $1500 a year. Brought up in N. E. mills and has been assistant supt. of a first-class plant for seven years. Age 31; American, married. Would prefer a Southern mill.

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1578 **Wool or Worsted Carder.** 20 years' experience as overseer, with excellent references. Understands almost all kinds of machines. Would also consider position as traveling agent for mill supplies, as he has a large acquaintance with mill men.

1580 **Boss Carder.** Experience on all kinds of wool stock, especially for knit goods. At present employed, but would like to change for a position paying $3, or over. Good references.

1574 **Woolen Carder,** with present employers 8 years, desires to change for larger room. Davis & Furber machines. References all right. Young man, steady and reliable.

1638 **Boss Woolen Carder.** Long experience in N. E. mills on both high and low grades. Would consider $3 a day. Excellent references.

1634 **Boss Wool Carder.** Employed for many years in well-known N. E. mill, but would change for position paying $3.50 a day. Is undoubtedly a first-class man and well worth this salary. Best of references.

1600 **Boss Woolen Carder.** Now employed, but desires to change for good reasons. Many years' experience in mills on American and English carding machinery. Age 41; American, married. Can start at once.

1617 **Boss Wool Carder or Second-hand.** Has held several first-class jobs, also has had experience on spinning. Can accept position at once. All grades of stock, including shoddies and cotton and wool and all wool.

1618 **Boss Wool Carder or Second-hand.** Excellent carder. At present out of work. Would like to get started. Experienced on American and English cards. Has had charge of seven set mill. Last position 15 years as overseer. Age 45; married.

COTTON CARDERS.

1403 **Cotton Carder** with 17 years experience in N. E. mills as overseer and second-hand, now in the South but wants to return North. Has never worked for less than $3.00 but would take $2.50 to change. Married. Age 38. Best of references.

1593 **Overseer Cotton Carding and Combing.** Now in charge of this department in a large N. E. mill. Has had first-class experience and is well recommended. Age 38; married, American. All grades of cotton.

1320 **Boss Cotton Carder.** Has been overseer for 12 years. Is at present employed, but desires to change for good reasons. Would accept $2.50 a day. Age 40; American, married.

1630 **Boss Carder or Comber.** 10 years' experience as second hand of carding and combing. Would like to secure an overseer's position at $3 a day. Has worked on all grades of foreign and domestic wools and is highly recommended by present and past employers. Englishman; age 25, married.

1596 **Cotton Comber and Carder.** Young man with 10 years' experience in N. E. mills. Would like position as overseer or second-hand. Is well recommended. Married. Will start at $2.50 per day.

WOOLEN SPINNERS.

1461 **Spinner, on Cotton or Wool.** Age 33; married; French. Has worked in one of the best thread works in this country, also in Alsace-Lorraine, on yarns from 70s to 160s. Is familiar with Dobson & Barlow machines and Schlumberger mules.

1493 **Boss Spinner.** Age 25; unmarried; German. Has worked on cassimeres, cheviots, stockinets, satinets and camel hair goods. Can operate American mules, and has worked for several years in American mills, to which he refers.

1595 **Overseer Worsted Spinning.** 10 years as overseer of spinning, twisting, reeling, dressing, spooling on worsted yarns. Englishman; age 41, married. Now employed, but does not like section of country. A first-class man in every respect.

678 **Woolen Spinner.** 18 years' experience as overseer of spinning and carding. Can handle both departments. Would take position in the West. Best of references. Age 43; married.

1543 **Woolen Spinner and Carder.** Has handled both departments together and separately. Will go South or West. Age 29; single.

1601 **Woolen Spinner or Second-hand.** Experience in hosiery and cloth mills. Will accept small wages to get started in satisfactory position.

COTTON SPINNERS.

909 **Overseer Cotton Spinning,** spooling, warping, twisting, slashing and drawing-in. 16 years experience, mostly in this department. At present out of work because of change in organization. Can refer to leading N. E. mills. Will go South. Age 30; married.

1609 **Boss Cotton Mule Spinning,** also ring spinning. Experience on 40's to 150's. A man capable of taking one of the best positions in the country. Held such a position in England until in 1892. Since then has been in N. E. mills. Age 48; married. Would undoubtedly make success as supt., but would accept first class position as overseer.

1619 **Cotton Ring Spinner.** Cotton yarns from 4's to 120's for hosiery, prints, etc., crape and other fancy yarns. Experience in several of the fancy cotton goods mills of N. E. as overseer. Can start at once. Age 40; married.

1592 **Overseer Cotton Ring Spinning.** Has worked his way up from back boy to second-hand in large N. E. mill, and has recommendations showing him to be capable of handling a room. American; age 40, married. Would require two weeks' notice. Will start at $3 a day.

1636 **Overseer Cotton Spinning, Spooling, Warping, Etc.** Has held position seven years of second-hand and has taken textile school courses. Having had unusual opportunities to learn, he feels competent to take position as overseer. Highly recommended by present employers.

1640 **Overseer Ring Spinning.** Has also had charge of twisting, spooling and beaming. A young man who has had excellent opportunities to learn this department, and has had charge for about a year. Would like to secure a first-class mill. Prefers N. E. or Central States.

WOOLEN WEAVERS.

1517 **Overseer Woolen Weaving.** Age 37; married. Has had a large experience on all classes of woolens and worsteds. Will go anywhere

1521 **Overseer Weaving,** on woolen or cotton goods. Age 42; American; married. Has worked on all classes of cotton, woolen, worsted and silk goods. Refers to past employers and others.

1585 **Woolen Weaver.** Has had large experience as fixer and weaver on Davis & Furber looms. A man of good habits and character. Now employed in a Massachussets mill. Good references. Also familiar with Crompton & Knowles and Gilbert looms

1452 **Boss Weaver, Superintendent,** or Designer. American; age 45; married. Has had 20 years experience on men's wear and ladies' woolen dress goods. Good recommendations from present and former employers. Good manager of help. Wishes to obtain a position where he will receive $4 and upwards per day.

1581 **Boss Weaver on Woolens** wants position in charge of a room on plain goods. Has worked on both plain and fancy work. At present employed. Can furnish excellent references from past jobs. Experience on Crompton & Knowles fancy, Gilbert and Davis & Furber plain looms. Age 40, married.

1629 **Boss Weaver or Second-hand** of woolens or worsteds. Experience covers 10 years in N. E. mills from weaver to second-hand. Will accept a second-hand's position paying $2.50 a day. Well recommended.

1607 **Worsted Weaver or Fixer** Will accept fixing job at $2.25 a day. Experience covers worsted coatings, cassimeres, dress goods and jacquard work. Familiar with Crompton and English looms.

COTTON WEAVERS.

1623 **Boss Cotton Weaver.** Has been fixer and second-hand in fine goods mills in N. E. and Penn. Age 26; English, married. Now employed as second-hand, but would like an overseer's job. Splendid references from present employer.

1605 **Overseer Cotton Weaving,** especially on fancies and leno. Has also worked on plain goods. Many years' experience in N. E. mills, starting as a fixer. Age 36; French, married.

1633 **Cotton Weaver.** At present in charge of over 500 looms in a Southern mill. Would like to change and would take position in the South at $2.50 a day. Well recommended. Y.

1572 **Overseer of Cotton Weaving,** now employed in first class mill as second-hand, but would like to have charge of a room at $3 a day. Experience covers sheetings, sateens, drills, flannels, denims and stripes of all kinds Lowell and Whitin looms. American; age 32, married. Excellent references from present and past employers.

1563 **Overseer Cotton Weaver** who has long experience as fixer, second hand and overseer on all kinds of cotton and silk looms. Splendid references from past employers. At present employed. Age 40; married

1556 **Cotton Weaver.** Learned fixing in England and has been 16 years in Canada, 8 years overseer of weaving, beaming and warping. Wants to work in the U. S. will accept $3.00. Age 33; married.

KNITTERS.

1544 **Underwear Knitter.** 10 years' experience on ribbed underwear. Has run silk, worsted, lisle, cotton and mixed yarn. Best references from present employer, with whom has worked four years Can leave at once.

1597 **Boss or Second-hand Underwear Knitter** Can accept position at once. Experience covers men's, women's and children's high, medium and low grades. Scott & Williams, Nye & Tredick, Snyder & Fisher machines.

889 **Boss Knitter or Finisher** on latch needle underwear. Large experience. At present employed, but could change on two weeks' notice. Best of references.

1628 **Underwear Knitter.** Good training. All kinds of machines. At present in charge of 85 frames, 11 years' experience. Age 28; American. Would change for $3 a day.

1631 **Hosiery Supt.** Has had charge of knitting departments in N. E. mills and has started several Southern hosiery mills. Experience covers cotton, wool and silk hosiery, gloves and mittens, and most all makes of machines. Very well recommended Can take position at once.

1603 **Overseer Underwear Knitting** Fleece lined goods a specialty. Long experience on many kinds of machines. Has also made hosiery. Will go anywhere except to Canada. First-class references.

1492 **Boss Knitter,** Spring needles. Now holding a position in N. W York. A No. 1 on fleeces, both single, double, and cut pressers. Understands running and setting in all gauges from 12 to 32. Working at present on 26 and 30. Understands all makes of latch needles for underwear.

1554 **Boss Knitter.** Underwear, Jersey ribbed, lisle, wool, plaited work, silk Can handle any latch machine. Good references. Age 26; married.

DYERS.

1531 **Boss Dyer.** American; Age 32; unmarried. Has had a large experience on raw stocks, rags, worsteds, yarns, pieces, cassimeres, kerseys and dress goods. Not at present employed. Can take position immediately.

1505 **Boss Dyer** on all classes of wool, woolen and worsted yarns, cotton warps, indigo, etc. Desires to change to better himself.

1476 **Boss Dyer.** Experience on kerseys, broadcloths, dress goods, cassimeres and worsted piece dyes. Has been in good mills for 3, 5 and 7 years and gave satisfaction. Would start in New England or Central States for $3.00 a day.

1612 **Dyer** on piece dye dress goods, long chain cotton yarn, cotton, raw stock. Prefers position in N. E. or New York state. Training in one of the best mills in N. E., and at present holds position as sample dyer. Excellent references. Age 28.

1626 **Dyer and Finisher,** with experience on plushes, dress goods, mohair and worsted genapped yarns, cotton and woolen yarns, raw stock. At present employed, but will consider position paying $3 a day.

1057 **Boss Dyer** on cotton, woolen, merino hosiery, yarns piece dye dress goods, rubber linings, felts, fast blacks, also mercerized cotton yarns and hosiery. Would expect good wages and can show excellent references.

DESIGNERS.

1635 **Designer** on colored cotton dress goods, and shirtings, and fancy worsted dress goods, piece dye, jacquard work in cotton, silk filing, also lappets. Would not consider position paying less than $1200 a year. Is at present employed in one of the leading mills, making fancy cotton, and is an especially bright young man. Early training in Scotland. Has been in this country about four years.

1591 **Designer** on fancy worsteds, cotton worsteds, fancy cassimeres, tweeds, fancy back overcoatings, etc. Experience in first-class N. E. mills. Age 30. At present employed, but can accept position at once.

1625 **Assistant Supt. or Designer** on woolens. Has been through all departments of woolen mill and has taken a Philadelphia Textile School course. Practical experience on fancy cassimeres, coverts, hairlines, ladies' dress goods. Very well spoken of. Hard worker.

1622 **Designer or Assistant Supt.** in woolen mill. Has made a specialty of steamer rugs and plaid back dress goods. Will start at $3 a day. Desires to change from present position on account of wife's health. An excellent opportunity to secure a first-class man at moderate wages.

1599 **Assistant Designer.** A young man who is studying woolen and worsted designing would like an opportunity to get practical experience, and will accept very small wages. Has worked in mill for two years as weaver on Crompton & Knowles looms. Excellent references as to character.

1598 **Woolen Designer or Supt.** Many years' experience in well-known mills. At present out of work. Can refer to well-known mill men, and will accept moderate wages until he can demonstrate his ability.

1621 **Designer or Assistant Supt.** on men's wear worsteds, cotton worsteds, overcoatings, cassimeres. High and low stock. Has been designer in several first class mills. Age 34; married.

FINISHERS.

1632 **Boss Finisher** on fancy and piece dye worsteds, kerseys, doeskins, cassimeres, etc., and all kinds of knit goods. A man of unusually large experience for his age and well recommended. Age 29; American. At present employed, but will change for $4 a day.

1614 **Boss Finisher** on fine fancy worsted, piece dyes, cheviots, cassimeres, coverts and flannels. At present employed, but could leave with eight days' notice. Age 41; married.

1627 **Underwear Finisher.** An A1 man. Has had charge of this department for 31 years in one of the best N. E. mills. Experience covers all departments, with the exception of knitting. White, dyed and mixed goods. First class in every respect. At present out of work because of shutting down of his department.

1615 **Boss Finisher** on cassimeres, cloakings, dress goods, kerseys, piece dye meltons, flannels. At present out of work, but has held good positions as boss finisher in N. E. mills. First class references. Age 36; married.

1613 **Boss Finisher.** One of the best finishers we know. Has held first-class positions and worked 13 years in last place. Is out at present for good reason. Would like to make a connection with a first class mill at once. All kinds of woolen and worsted goods.

MISCELLANEOUS.

1571 **Woolen Salesman,** who has filled successfully all positions in woolen jobbing house, desires a position with manufacturer or dealer in textile goods. Fine business qualifications and A 1 references.

1418 **Cloth Hall.** Overseer, shipping clerk or paymaster. Has had a thorough experience in each of the above positions and is familiar with white and colored cotton goods. Is well recommended. Aged 35. Married, and is also a good all around accountant.

1488 **Boss Carpenter or Master Mechanic.** Age 40; American. Is acquainted with all makes of cotton machinery, and is a good man on shafting, wood work, etc. At present employed, but wishes to better himself.

1557 **Bleacher,** overseer or second hand. Well recommended, good training, reliable. Wants $2.50. Age 27; married.

1558 **Supt. of Bleaching,** dyeing and finishing, of all classes of cotton piece goods, plain and figured, desires a position. Has had over 20 years' experience in managing help, and has a thorough knowledge of the business in all its branches. Can furnish excellent references from present and past employers.

1555 **Silk Superintendent.** Experience in all departments of a large and successful mill; serges, sateens, linings. Young man but well qualified to take charge or act as assistant superintendent. Knowledge of office work and prices as well as machinery.

1583 **Overseer of Cloth Room.** A young American, married, would like a position as office assistant, shipping clerk or in cloth room. Has had about six years' experience in Connecticut cotton mills. Will start at moderate wages if there is prospect of future advancement.

1602 **Overseer of Cotton Mixing.** Is at present second-hand in cotton opening room of large N. E. mill, and has had several years' experience in this position. Could handle this department satisfactorily. Good references. Age 28; married, American.

1611 **Boss Wool Sorter.** Has had charge of this department in several first-class mills on woolen and worsted grades. First-class references. Age 36, married.

1639 **Silk Supt. or Boss Weaver.** Experience covers ribbons, piece goods, velvets, jacquard, plain and plaids. Has had practical experience as loom fixer, designer and overseer. Early training in Germany and later in some of the best silk mills in this country.

1637 **Silk Finisher or Second-hand.** Has had practical charge of this department for the past two years and wants larger experience. Would change for a very moderate salary, if opportunity for advancement was good.

SUPT. WITH CAPITAL.

Experienced young man with some capital wishes to invest same with services or services alone, as superintendent of small woolen or worsted mill or assistant superintendent of large plant. Best of references. Address, H. C., care of Texile World.

Bleached Cotton Goods in Paraguay.

A recent consular report to the State Department, Washington, D. C., says that bleached cottons represent one of the most important importations of Paraguay. The trade in this line is not subject to the caprices of style. The goods are always in demand in both city and country. England has captured the trade here in white goods, but it is thought that there are opportunities for our exporters to get a share of this traffic, if they would send a man to represent them or samples to be placed on exhibition.

The leading fabric, or the most popular one, is 76 by 80 threads to the square inch; width, 35½ inches; length, 20 yards. These goods, however, should be marked in meters, because this is more convenient and profitable for the retail merchants, who buy by the meter and sell by the "vara," in which transaction they gain the difference—the meter being longer than the vara. The retailer pays $14 Paraguayan money (about $2 gold) for a piece of 20 yards. If the price could be lowered, so that the retailer could buy it for $1.75 or $1.80 gold, a piece, this trade would be secured. Another popular make is 30 inches wide, and is bought for 69 cents from English commission firms.

The people desire the lowest prices. While American goods show their superiority in texture, etc., after they are washed, their quality does not influence the people. They want something that looks well and at the same time feels well—a smooth, compact surface. They do not care if it is nearly all starch; after it has been worn or washed out, they buy a new piece, because it is cheap.

The goods should always be put up in book fold, with the trade-mark covering the whole front, if possible. It should be in glaring colors, and the goods should have ribbon around them.

The usual credit is for six months.

Wool and Sheep in Germany.

The decrease of sheep breeding and the increase of the importation of wool into Germany have a mutual bearing, and naturally inflict serious damage upon that country's product.

According to the report of the Prussian Landes-Oeconomie-Collegiums, the average loss to farmers in the last twelve years, caused by the falling off in sheep breeding, amounted annually to $8,568,000. The number of sheep has decreased 12,000,000 head, thereby causing a meat-value loss of $5,712,000. In 1894, Germany imported 373,890,000 pounds of wool, and produced 44,000,000 pounds.

In Germany the number of sheep has decreased from 40,000,000 to 10,000,000 head.

In 1898, the wool came principally from the following countries:

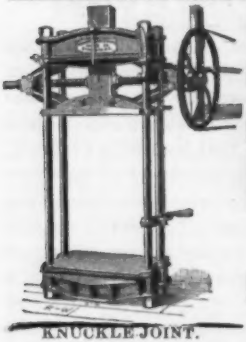
Country.	Quantity. Pounds.	Value.
Argentine	97,945,435	$13,210,500
Australia	36,606,307	5,620,000
Cape Colony	15,535,548	2,530,000
Uruguay	8,847,780	1,088,000
Great Britain	37,104,417	6,980,000
Belgium	5,835,312	815,000
France	1,840,309	364,000

A New Process of Dyeing.

There has recently been invented, by a German, a process for dyeing textiles with alizarine and other mordant dyestuffs, the value of which we know nothing about from any demonstration that we have heard of, but we present it for what it is worth.

The dyeing mechanically of textile materials loose or in other states of manufacturing has hitherto been only possible with coloring-matters soluble in water, the insoluble mordant dyes, such as alizarine, etc., not being capable of use in this way but in a few cases—that is to say, for yarn in hanks, cloth, etc.—and this in a very complicated manner.

A process is now said to have been found permitting the dyeing of fibres loose and in any other state of manufacturing, and especially those which are to be dyed mechanically by using them in the form of alkaline solutions.



KNUCKLE JOINT.

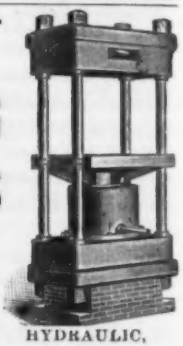
BOOMER & BOSCHERT

BALING PRESSES

ARE THE STANDARD.

Boomer & Boschert Press Co.

338 West Water St., SYRACUSE, N. Y.



HYDRAULIC.

EASTON AND BURNHAM MACHINE CO.,

Pawtucket, R.I.

ALL KINDS OF Spindles USED IN THE MANUFACTURE OF COTTON, WOOL & SILK

IMPROVED UPRIGHT SPOOLERS

TO SPOOL FROM COP, SKEIN, OR BOBBIN.

Pocasset Worsted Co.

WORSTED YARNS

For Weaving and Knitting Purposes.

THORNTON, R. I.

Knitting and Weaving Yarns

Cones, Cops, Warps, Skeins,
Single, Double, Three-ply, etc.
Peeler, Egyptian, Mixed Colors.
Large Assortment.

EDWARD S. HYDE, 223 and 225 Chestnut Street, Philadelphia, Pa.

YARN DEPARTMENT.

Eastern Yarn Market.

Cotton Yarn: Prices have advanced on cotton yarn since our last month's report, due to the large demand for it and the advance in the cost of the raw material. The demand for this kind of yarn exceeds the production of the mills, with the prospect that this will continue for some time to come, which makes the mills perfectly indifferent concerning contracts, which enables them to name their own terms. Buyers need not expect any concession for some time to come. Quotations cannot be considered in any other light than nominal.

Worsted Yarn: Spinners are all busy with more orders than can well be handled, and in consequence weavers are much annoyed at slow deliveries. Prices continue to advance and spinners are accepting orders cautiously and are not taking orders for long deliveries. Yarns have still a good leaway to advance because of the tariff. Prices have not reached the old standard of values or the basis of profit enjoyed prior to the Wilson tariff law. Yarn salesmen are now on the lookout for orders for next season's business, but prices have much advanced. Spinners and weavers both are looking for a splendid heavy weight season. After that the opinion is that it would be a good thing for spinners to look out for themselves. The present and coming seasons have been worsted seasons, but prices may get so high that the weavers will put more woolen spun yarn in their cloth to bring down the cost, and, besides this, the style is headed more toward cloth out of wool-spun yarn. There is also coming the old demand for fine cloth out of Australian wool in 2/40s and 2/50s same as it was before the craze for cheviots. The price for this fine Australian yarn is $1.27 per pound. The American woolen manufacturer has at the present time the American market as the high price of wool, together with the present duty, makes it impossible for the foreigner to get in by from 25 to 50 cents per yard. The going cloth is being made from ½ blood territory wool in numbers ranging from 2/26s to 2/32s, although, as has been noted above, the excelsior trade is working in the finer counts, 2/40s and 2/50s, out of Australian. The worsted yarn business is booming both in English and French spun yarn. While there are some samples of cheviot cloth in fancy colors being shown, the trade cannot be budged from the trend for finer and smoother cloth. French spun yarn is in good demand. Prices have much advanced, and the production is not large enough to take care of the demand, and buyers are trying to place orders for future delivery in large amount. Prices have advanced about 20 cents per pound. Yarns which have been selling for 72½ cents are now being offered at 90 cents per pound, and those selling at old rate of 85 cents are now selling for $1.05, and spinners do not care whether they get orders at this price or not. Underwear knitters and hosiery manufacturers are most interested in this class of yarn; although this great advance may force them to use more wool spun yarn or merino yarn. We also note that there are two English spun-yarn mills and one French system yarn mill being started at this time. It is reported that some of the large top mills taking advantage of the present condition of high prices in Europe are combing ½ blood territory wool, and are exporting to Europe. In this way buyers save the freight on 75 to 80 per cent. dirt and waste product. The dress goods manufacturers continue busy, most of whom are still making the rough effect in grays and plaids. The better class of dress goods mills are running on very fine wool making smooth cloth.

Frank E. Patterson, Prest. Oscar W. Wood,

Germantown Spinning Co.

COTTON CARDED

HOSIERY YARNS

In numbers from 6s to 26s.

Germantown, Philadelphia.

W. Warren Thread Works,

SPOOL COTTON

on 100 to 12,000 yd. Spools or Tubes.

A Specialty of Thread for Manufacturers Use

on Spools, Tubes or Bobbins.

Also Seaming and Hosiery Yarns

on Cones, Tubes or Skein.

Our bleaching and dyeing facilities are new and unsurpassed for prompt and neat work. Correspondence solicited.

WESTFIELD, MASS.

The Best is the Cheapest.

It is BETTER and CHEAPER to wind yarn by the "Universal" system before shipment from the mill, thus insuring perfect delivery to knitting machines without rewinding.

UNIVERSAL WINDING CO.,

F. H. BISHOP, Manager.

226 Devonshire St., - Boston, Mass.

(Continued from page 147.)

Woolen Yarn: Spinners are generally busy with an exceptionally good season ahead for them. The heavy weight season will start again in December. The weavers are having a demand for worsted cloth with all-wool backs, thus requiring wool-spun backing yarn, and also are using as much wool yarn as is possible to take the place of high priced worsted yarn. There is to be no cotton backs made the coming season as buyers have condemned this class of cloth. Weavers are cautioning their spinners against allowing the slightest trace of cotton in their yarn, and are testing all yarn received for this defect. Weavers are beginning to make contracts for next season, as, without doubt, there is to be a shortage of wool spinning machinery, and spinners, seeing this later, will undoubtedly advance prices all around. The underwear manufacturers are beginning to get many orders. The weavers heretofore have been the favored ones, or if knitters have been busy it has been entirely on cotton fabrics or plush backs. The trade seems to have gotten tired of the above garments and are now back on all-wool garments. Manufacturers who have been using but a small quantity of wool are now on the market for large amounts. The knitters are working hard to secure cheaper material, but are not successful. The dealers, as well as all the manufacturers, are entirely out of ante-tariff wool, and in a short time 65-cent Australian lambs will be a price of the past. All kinds of high prices are now predicted for wool. Some state that fine territory will surely reach 70 cents per pound. When this happens, however, the importer of Australian thread waste will have this article for sale, which can be imported today for 58 to 64 cents per pound. The mills are generally busy throughout the Mohawk valley. Cotton back plush garments are being neglected by buyers, and knitters of the better grades

(Continued on page 151.)

CATLIN & CO.,
YARNS.
67 Chauncy St., Boston
316 Church St., New York.
306 Chestnut St., Philadelphia.

Walcott & Campbell Spinning Co,
IROQUOIS MILLS.
FANCY HOSIERY YARNS
IN ALL COLORS.
New York Mills, Oneida Co., N. Y.

JAMES E. MITCHELL & CO.,
Commission Merchants.
122 & 124 Chestnut St., Philadelpia, Pa.
74-78 Summer St., Boston.
Cotton, Woolen & Worsted Yarns.
All numbers on Hand and Made to Order.

Cohannet Mills,
TAUNTON, MASS.
Spinners of High Grade
HOSIERY YARNS OF EVERY DESCRIPTION.
Selling Agents JAMES E. MITCHELL & CO, Philadelphia and Boston.

TUCKER & COOK MFG. CO
MANUFACTURERS OF
WHITE AND COLORED COTTON **WARPS**
Nos. 6s to 30s,
On Beams, Jack Spools or in Chain
CONWAY, MASS.

GRANT YARN CO.,
COMBED AND CARDED COTTON
YARNS 40s and above. AND
FITCHBURG, MASS. **WARPS**

E. JENCKES MFG. CO.
Colored Cotton, Hosiery, Woolen and Merino **YARNS**
PAWTUCKET, R. I.

LINEN YARN IMPORTER.
Hughes Fawcett, 115 Franklin St., New York,
Flax, Hemp & Jute Line and Tow Yarns,
FOR WEAVING PURPOSES
Linen Jacquard Harness Twines.
Fine Cotton Harness and Heddle Twines.
For Cotton, Silk, Woolen and Carpet manufacturers. Correspondence solicited. Samples promptly furnished.

CAPACITY, 50,000 Spindles.

ORSWELL MILLS

FITCHBURG MASS.

COMBED OR CARDED

COTTON YARNS

In Chains and Skeins, on Balls, Beams, Spools—single or twisted.

...CORRESPOND WITH THE...

American Moistening Company, Boston, Mass.,

And learn what their system of air moistening has accomplished. The

"DROSOPHORE" AND "VORTEX" HUMIDIFIERS

Have been most advantageously adopted by the representative mills of this country. Our system will increase your production and overcome troublesome electricity, making your carding run much better. It will reduce your waste account, and generally prove a profitable investment. With our system a perfect **Spinning** or **Weaving** atmosphere in any climate or weather is assured, and any degree of humidity is obtainable. Will cool the air in warm weather, and warm it in cold weather. **Purifies the air and makes it healthier for the work people.** Write for Booklet on Humidification.

AMERICAN MOISTENING COMPANY, 150 Devonshire Street, Boston, Mass.

PLAIN AND FANCY PATTERN

Cotton Warps,

WHITE, MIXED AND COLORED.

For SATINETS, BLANKETS, ETC.

WHITTIER COTTON MILLS,

LOWELL, MASS.

INDIAN ORCHARD COMPANY,

Indian Orchard, Mass.

Manufacturers of - - - -

COTTON WARPS AND YARNS

In gray and all colors, single or in any twist.

COLORED COTTON

Machined, Carded or in Roving.

NOVELTY YARNS

In Cotton, Mercirized Cotton, Silk and Worsted, in various Patterns, Colors and Twists. We are always pleased to assist our patrons of the Woolen Goods manufacture in special pattern warps for samples.

We use a uniform grade of long stapled cotton in all our manufacture.

(Continued from page 149.)

are using and buying woolen yarn. The general belief from those who have no special interest in booming Australian wool is that the price has reached its highest level. The present prices are higher than this wool has sold since 1874. It is believed that speculation has had much to do with this most extraordinary advance and it is wholly from a statistical standpoint that prices have been maintained. The dealers say they have fleece wools coming from Australia which will be sold for more than 85 cents per pound. One thing seems certain, if the demand for wools continues, in December and January the price of wool in this country will reach a very high level. Australian wools opened in Australia at an advance of 50 per cent. higher than one year ago. Our territory wools are firmly held and prices are being marked up.

—A great change seems imminent in the manufacture of sulphuric acid. The Baden Aniline Soda Factory has patented a most important improvement in the production of this substance. By this new process there is an immense saving in fuel, and the expensive platina apparatus is no longer necessary. More important still is the fact that no salt-petre is required by the new process. Salt-petre is of such enormous value for agricultural and technical purposes that any economy in its use must be welcomed, the more so as the salt-petre fields will, in course of time, be exhausted.

Philadelphia Yarn Market.

The past month has been one of exceptional activity, and advances of values in the cotton and yarn market. Spinners generally put a considerable advance on their prices, early last month. Then, the cotton market became active, and the advanced price, which had been put on the goods, was lost sight of. Spinners are making

(Continued on page 153.)

WOOLEN AND MERINO
YARNS. Special line for Bicycle and Golf Goods in all shades
For Hosiery, Gloves, Underwear, and all kinds Knit Goods. Cop, Cone and Skeins.
The J. & H. Clasgens Co.
New Richmond, O

Eddy & Street,
COTTON, YARNS WORSTED,
AND
WOOLEN, BRAIDS SPUN SILK.
PROVIDENCE, R. I.

A. HERBST. J. W. JONES.
HERBST & JONES,
KENNEBEC WORSTED MILLS.
Successors to Kershaw Worsted Co.
WORSTED YARN SPINNERS,
21st & Naudain Streets,
PHILADELPHIA.

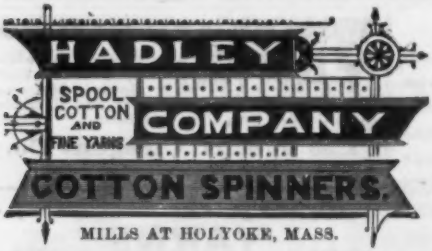
ALBERT R. ELSASSER,
Clifton Worsted Mills,
WORSTED YARNS.
Lustre Worsted a Specialty.
Mills: Addingham, Del. Co., Pa.

C. MOORE & CO.,
MANUFACTURERS OF
TWINES, THREADS AND YARNS.
Jacquard Harness Twines of all kinds
on hand and made to order.
S.W. COR. FIFTH & MARKET STS.,
Philadelphia.

EICHMANN & STERNBERG
530 Broadway cor. Spring St., NEW YORK.
Plain and Gassed Cotton Yarns,
HOSIERY COTTON YARNS,
Mercerized Cotton Yarns. Harness Twines.

RICHARD CAMPION,
Selling Agent for—
Bristol Worsted Mills,
Highland Worsted Mills.
17 Bank Street, Philadelphia, Pa.

WAVERLY WORSTED CO.
SPINNERS OF
WORSTED YARNS
FOR WEAVING AND KNITTING.
Main St. & Green Lane, Manayunk, Philadelphia.



SPINNERS OF

FINE COTTON YARNS

30s TO 100s.

Gray, Bleached, or Colored. On cop, in skein on spools, cones or tubes.

Fine Cotton Warps, single and two-ply, in chain, etc.

Spool Cotton and Seaming Thread.

95 Milk St., BOSTON.

THE WILLIAM CLARK COMPANY,

WESTERLY, R. I.

Mills equipped with the latest and most improved machinery.

Combed Egyptian from No. 20s to 100s. Combed Sea Island from No. 40s to 200s.

Also 2, 3, 4, 5 ply and 6, 9 and 12 ply cable laid.

Hosiery Yarns on Cops Tubes or in Skeins, Grey, Bleached or Dyed. (Fast Colors.

MONUMENT MILLS,

Manufacturers of

White, Colored, Fancy and Double and Twist,

COTTON WARPS

HOUSATONIC, MASS. 4s to 60s.

GREENE & DANIELS MFG. CO.,

COMBED, CARDED AND GASSED

Yarns, Threads, Twines and Chain Warps,

Colored and Bleached Yarns Furnished in any manner desired by the trade. PAWTUCKET, R.I.

Established 1849.

CARRIAGE CLOTHS.

LIVERY CLOTHS.

ACCOUNTS SOLICITED.
Broad Cloths, Sackings,
Cotton Warps, Whip Cords.

C. Coles Dusenbury & Son,
396 & 398 Broadway, N. Y. City.

HAYES, O. H. & CO.

Representative Lines of Woolens

O. H. HAYES & CO.

Liberal arrangements made with manufacturers or men controlling mills' productions.

(Continued from page 151.)

new prices nearly every day and generally making no quotations, except subject to change without notice. Any quotation we could make today would be possibly entirely wrong by next week. Figures that we would name would be only nominal. The list made by spinners is about as follows for minimum prices:—

Warps:

40/2	23 to 24
36/3	22½
30/2	19½
26/2	16½ to 17
20/2	16½
16/2	15
8/2	13
8/3	13

Skein:

16/2	14½
14/2	14 to 14½
12/2	14
10/2	13½
8/3	12½ to 12¾

Single warps, 1 cent less than two-ply warps.

Single skein, 1¼ cents less than two-ply warps.

Southern cone yarns are selling about as follows:

6s to 8s	12½ to 13½
10s	13½ to 14½
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16s	16 to 16½
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24s	18½ to 19
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(Continued on page 149.)

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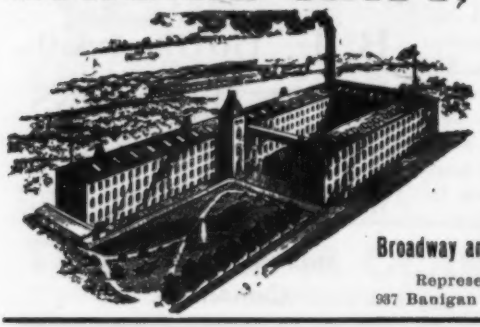

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(Continued from page 153.)

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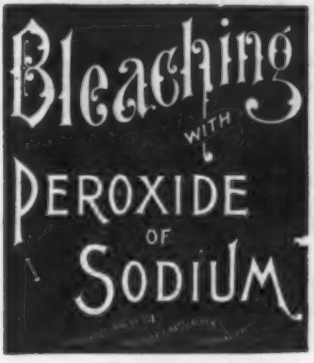

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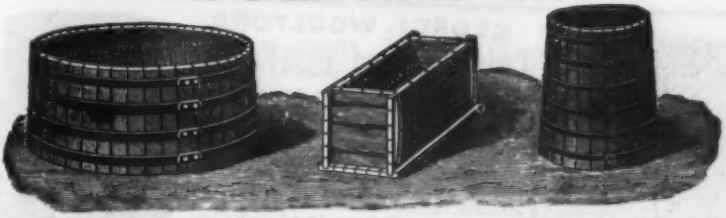

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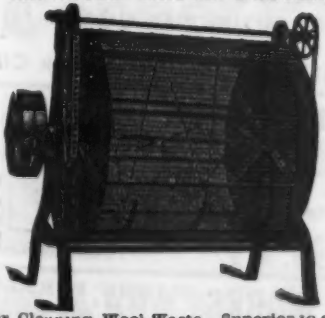

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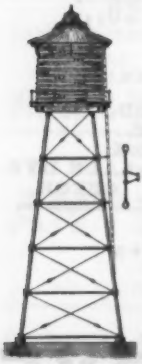

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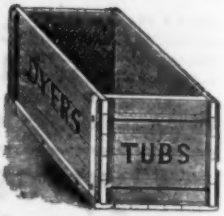

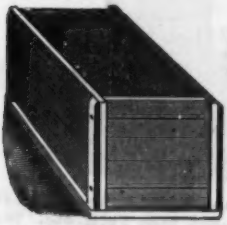

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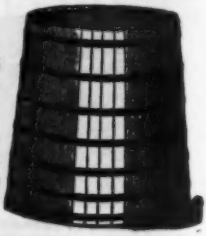

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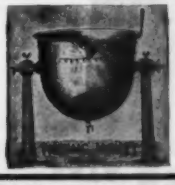

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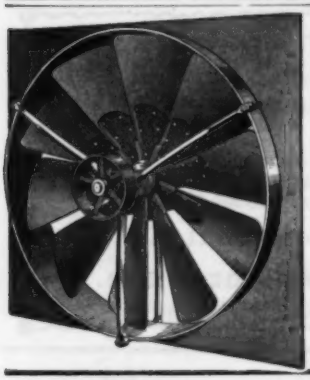

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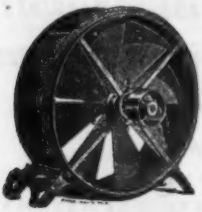

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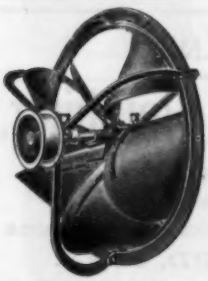

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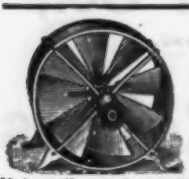

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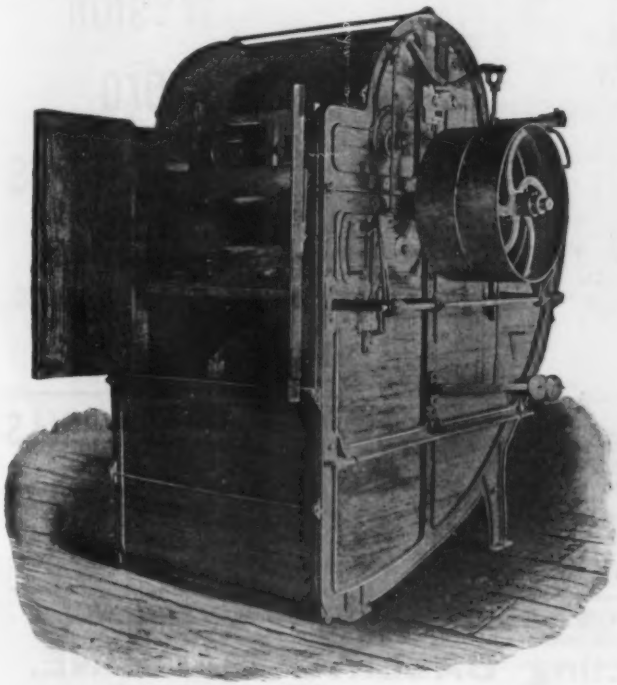

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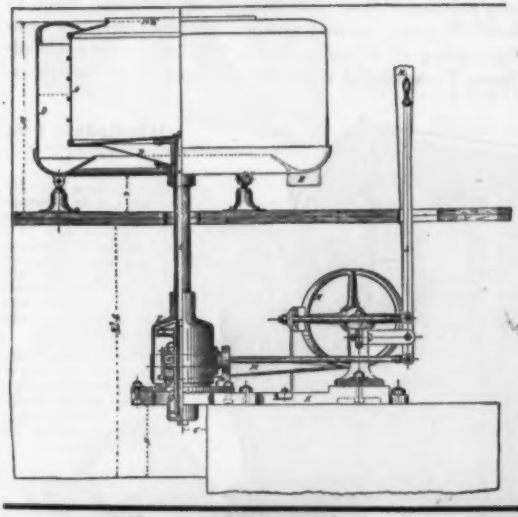

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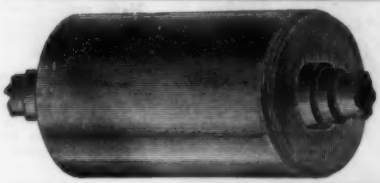

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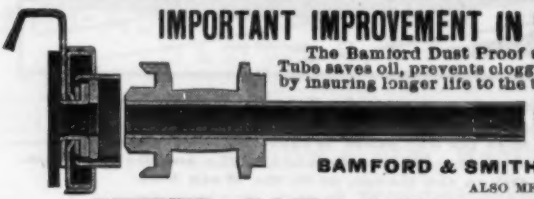

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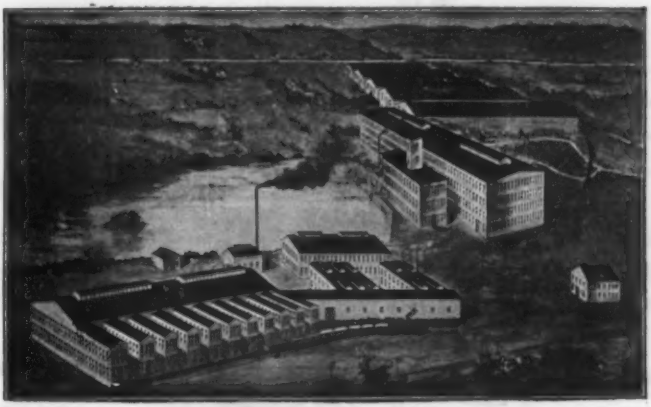

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In knitting "string work," **a loose course** is put in as a guide for cutting off each stocking. **A loose course can be be put in for looping** the toes. This is a great advantage in fine gauges.

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The method of doing this is entirely new, and must not be confounded with the ordinary method of transferring with a quilling.

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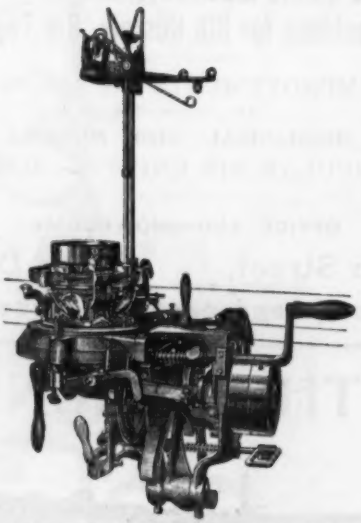

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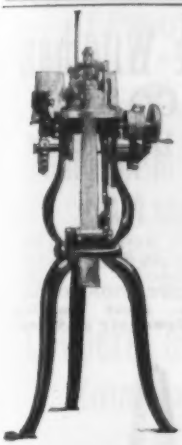

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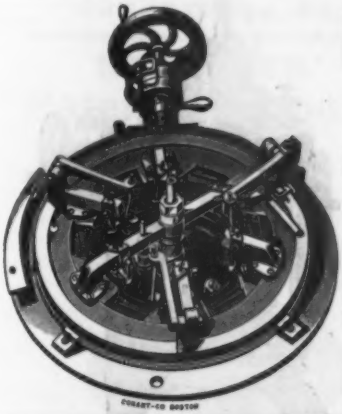

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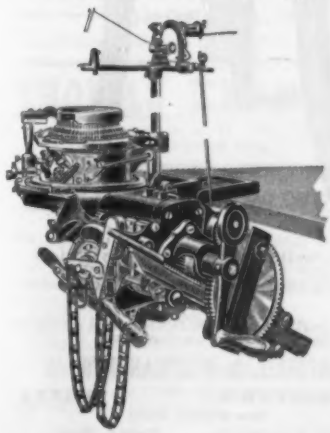

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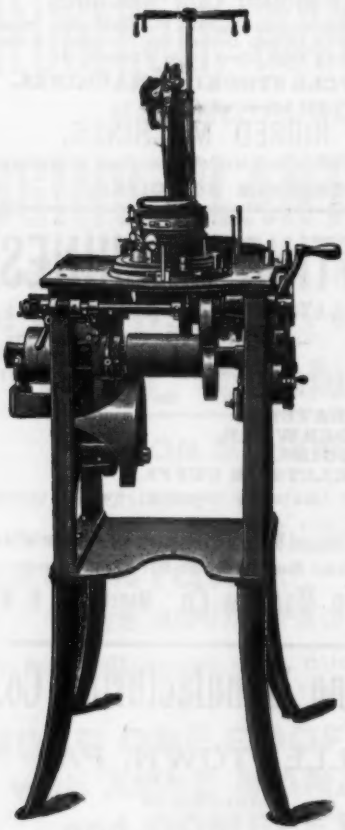

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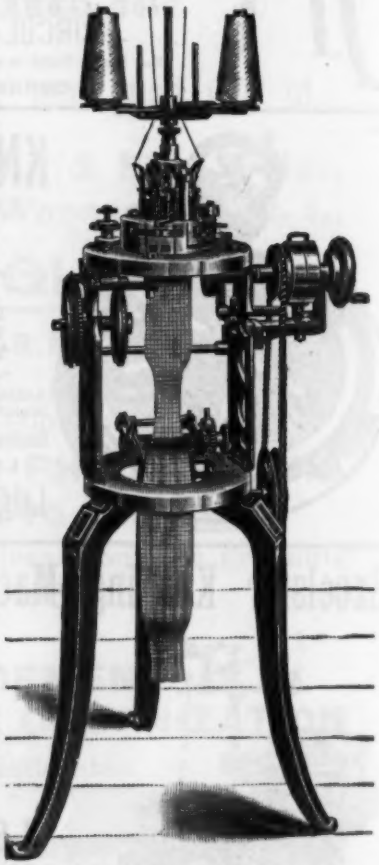

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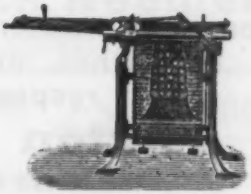

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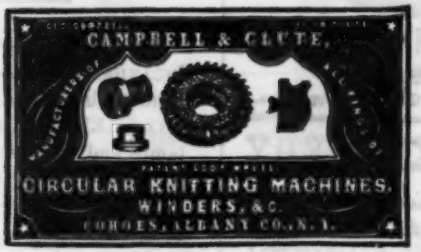

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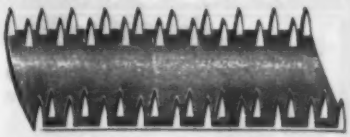

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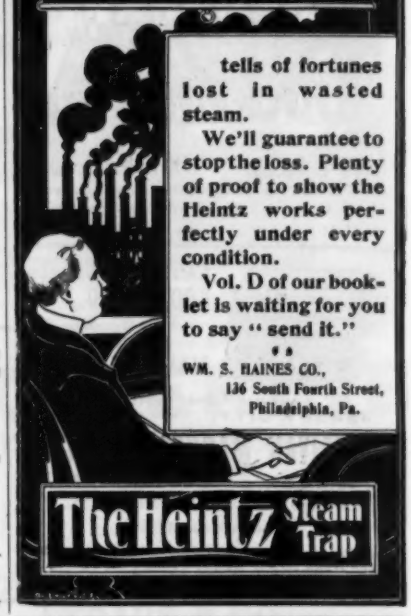

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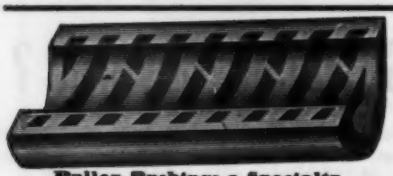

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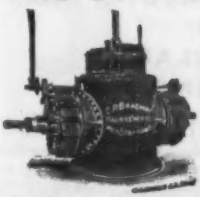

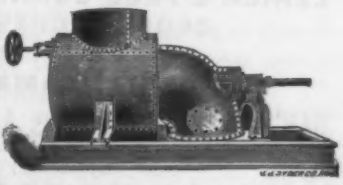

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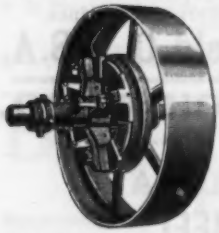

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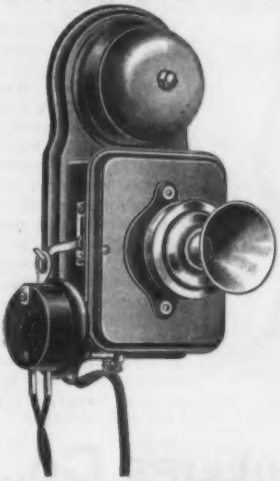

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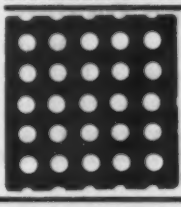

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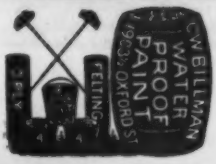

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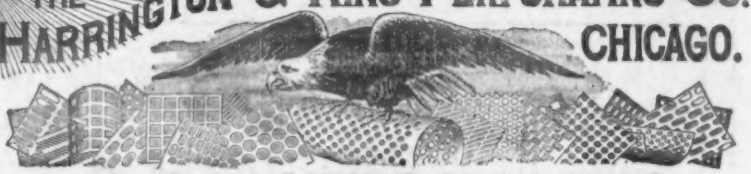

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Office, Paterson Nat. Bank, Paterson, N. J.
Mill Building a Specialty.
References made to some of the largest mill owners in the Middle States, including Clark Thread Co., Newark, N. J.; Barbour Flax Spinning Co., Paterson, N. J., and others.

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